Solutia, Inc.
St. Louis, Missouri

ENSR INTERNATIONAL

Sauget Area 1 – EE/CA and RI/FS
Volume II

Human Health Risk Assessment
Sauget Area 1
Sauget and Cahokia, Illinois

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December, 2000
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Revision 0

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CONTENTS

CONTENTS (Cont'd)

CONTENTS (Cont'd)

CONTENTS (Cont'd)

CONTENTS (Cont'd)

Appendices:

LIST OF TABLES

LIST OF TABLES (Cont'd)

LIST OF TABLES (Cont'd)

LIST OF TABLES (Cont'd)

LIST OF FIGURES

LIST OF ACRONYMS

AAF	Absorption Adjustment Factors
ACGIH	American Conference of Governmental Industrial Hygienists
AOC	Administrative Order by Consent
ASTM	American Society for Testing and Materials
ATSDR	Agency for Toxic Substances and Disease Registry
AWQC	Ambient Water Quality Criteria
BEI	Biological Exposure Indices
bgs	below ground surface
BPL	Borrow Pit Lake
CADD	Chronic Average Daily Dose
CAS	Chemical Abstracts Service
COC	Constituent of Concern
COPC	Constituent of Potential Concern
CS	Creek Segment
CSF	Cancer Slope Factor
CSM	Conceptual Site Model
DQL	Data Quality Level
EE/CA	Engineering Evaluation and Cost Analysis
EFH	Exposure Factors Handbook
ELCR	Excess Lifetime Cancer Risk
EPC	Exposure Point Concentration
ESL	Effects Screening Level
HEAST	Health Effects Assessment Summary Tables
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
IEPA	Illinois Environmental Protection Agency
IRIS	Integrated Risk Information System
LADD	Lifetime Average Daily Dose
LMS	Linearized Multi-Stage
LOAEL	Lowest Observed Adverse Effect Level
MLE	Most Likely Exposure
NCEA	National Center for Environmental Assessment
NCP	National Contingency Plan
NIOSH	National Institute of Occupational Safety and Health
NOAA	National Oceanographic and Atmospheric Administration
NOAEL	No Observed Adverse Effect Level
PAH	Polycyclic Aromatic Hydrocarbons
PC	Skin Permeability Constant
PCB	Polychlorinated Biphenyl

LIST OF ACRONYMS (Cont'd)

PEF	Particulate Emission Factor
PM10	Particulate Matter with Mean Diameter ≤ 10 microns
PQL	Practical Quantitation Limit
PRG	Preliminary Remediation Goal
QAPP	Quality Assurance Project Plan
RAGS	Risk Assessment Guidance for Superfund
RBC	Risk-Based Concentration
RfC	Reference Concentration
RfD	Reference Dose
RG	Remedial Goal
RI/FS	Remedial Investigation and Feasibility Study
RI/SC	Remedial Investigation/Site Characterization
RME	Reasonable Maximum Exposure
SOW	Scope of Work
SSL	Soil Screening Level
SSP	Support Sampling Plan
SQL	Sample Quantitation Limit
STCOPC	Short-Term Constituent of Potential Concern
SVOC	Semi-Volatile Organic Compound
TACO	Tiered Approach to Corrective Action Objectives
TCDD	Tetrachlorodibenzo-p-dioxin
TCLP	Toxicity Characteristic Leaching Procedure
TEF	Toxic Equivalence Factor
TEQ	Toxic Equivalence Concentration
TLV	Threshold Limit Value
TNRCC	Texas Natural Resources Conservation Commission
TPH	Total Petroleum Hydrocarbons
UAO	Unilateral Administrative Order
UCL	Upper Confidence Limit
USEPA	U.S. Environmental Protection Agency
VOC	Volatile Organic Compounds
WHO	World Health Organization

1.0 INTRODUCTION

This report presents the baseline human health risk assessment (HHRA) and the stream-lined short-term risk assessment for Sauget Area 1, located in Sauget and Cahokia, Illinois. It is Volume II of the Remedial Investigation/Site Characterization Report (RI/SC) for Sauget Area 1 (in preparation). The environmental evaluations of Sauget Area 1 are being conducted as an Engineering Evaluation and Cost Analysis (EE/CA) for the Sauget Area 1 sites and soil, sediment, surface water and air, and for the Remedial Investigation and Feasibility Study (RI/FS) for Sauget Area 1 groundwater. The HHRA was conducted to satisfy the Scope of Work (SOW) for the EE/CA and RI/FS (specifically Task 4 Section 2.5 and Task 5 Section 2 of the SOW) provided as an attachment to the Administrative Order by Consent (AOC) entered into by the U.S. Environmental Protection Agency (USEPA) and Solutia Inc. (Solutia), as well as to be compliant with the National Contingency Plan (NCP) (USEPA, 1990).

The HHRA and the short-term risk assessment were conducted in accordance with the USEPA-approved Human Health Risk Assessment Workplan (HHRA Workplan) dated June 25, 1999 (including the August 6, 1999 revised pages), which was submitted as Volume 1B of the Support Sampling Plan (SSP) for Sauget Area 1 (Solutia, 1999). The HHRA Workplan is provided as Appendix A to this report. [Note that sections, figures and tables from the HHRA Workplan will be referenced in this report. Because of the similarity of numbering, the following approach has been taken to identify workplan elements: "Figure (Appendix A) 2-1" refers to an HHRA Workplan figure, and "Figure 2-1" refers to an HHRA Report figure.]

The HHRA and the short-term risk assessment were conducted using data from environmental samples collected from the study area (shown in Figure 1-1 and described in more detail in Section 2) in accordance with the USEPA-approved SSP. Validated laboratory analytical data are compiled in the Data Validation Report (Solutia, 2000a), and field data are compiled in the Field Sampling Report (Solutia, 2000b). These data are summarized and evaluated in the RI/SC (of which this report is Volume II).

Baseline Risk Assessment

The purpose of the baseline HHRA is to evaluate potential human health effects of chronic daily exposures to constituents detected in samples of environmental media collected from the study area.

The HHRA was conducted to be consistent with USEPA guidance for conducting a risk assessment including, but not limited to, the following:

- Risk Assessment Guidance for Superfund (RAGS): Volume 1 - Human Health Evaluation Manual (Parts A and D) (USEPA, 1989a and 1998a).

- Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions (USEPA, 1991a).
- USEPA Soil Screening Guidance: User's Guidance Manual, and Technical Background Document (USEPA, 1996a,b).
- Human Health Evaluation Manual Supplemental Guidance; Standard Default Exposure Factors. OSWER Directive 9285.6-03 (USEPA, 1991b).
- Exposure Factors Handbook (USEPA, 1997a).
- Land Use in CERCLA Remedy Selection Process. OSWER Directive No. 9355.7-04 (USEPA, 1995a).

In addition, elements of the Illinois Environmental Protection Agency (IEPA) Tiered Approach to Corrective Action Objectives (TACO) (IEPA, 1998) were used in the conduct of the HHRA.

The baseline HHRA has been conducted in accordance with the four-step paradigm for human health risk assessments developed by USEPA (USEPA, 1989a); these steps are:

- Data Evaluation and Hazard Identification
- Toxicity Assessment
- Exposure Assessment
- Risk Characterization

Streamlined Short-Term Risk Assessment

The purpose of the short-term risk assessment is to evaluate potential human health effects of short-term (i.e., subchronic) exposures to constituents detected in samples of environmental media collected as part of the SSP. Since short-term health evaluations are not a standard component of most hazardous waste site health assessments, limited guidance exists for performing these types of evaluations. The short-term evaluation was conducted using the same four-step paradigm presented above for the baseline HHRA, and followed the procedures presented in the HHRA Workplan.

Report Organization

A description of the site is presented in Section 2.0. The baseline HHRA is presented in Section 3.0 through 6.0 of this report. The short-term risk assessment is presented in Section 7.0. Section 8.0 presents the summary and conclusions and Section 9.0 provides the references. A summary of the information presented in each section of the report follows.

- Section 2.0 – Site Characterization. This section discusses the site and its environs, describes source areas, potential migration pathways, and potentially impacted media.

- Section 3.0 – Data Evaluation and Hazard Identification. This section presents a summary of the site data for use in the HHRA, and the results of the process used for the selection of constituents of potential concern (COPCs) to be quantitatively evaluated in the baseline HHRA.

- Section 4.0 – Dose-Response Assessment. The dose-response assessment evaluates the relationship between the magnitude of exposure (dose) and the potential for occurrence of specific health effects (response) for each COPC. Both potential carcinogenic and noncarcinogenic effects are considered. This section presents the quantitative dose-response values used in the baseline HHRA. The most current USEPA verified dose-response values are used when available.

- Section 5.0 – Exposure Assessment. The purpose of the exposure assessment is to provide a quantitative estimate of the magnitude and frequency of potential exposure to COPCs by a receptor. This section presents the updated conceptual site model (CSM) originally presented in the HHRA Workplan. Potentially exposed individuals, and the pathways through which those individuals may be exposed to COPCs are identified based on the physical characteristics of the site, as well as the current and reasonably foreseeable future uses of the site and surrounding area. The extent of a receptor's exposure is estimated by constructing exposure scenarios that describe the potential pathways of exposure to COPCs and the activities and behaviors of individuals that might lead to contact with COPCs in the environment.

- Section 6.0 – Risk Characterization. Risk characterization combines the results of the exposure assessment and the toxicity assessment to derive site-specific estimates of potentially carcinogenic and noncarcinogenic risks resulting from both current and reasonably foreseeable potential human exposures to COPCs. The results of the risk characterization are used to identify constituents of concern (COCs), which are a subset of those COPCs whose risks result in an exceedance of the target risk range of 1×10^{-6} to 1×10^{-4} for potential carcinogens and a target Hazard Index of one for noncarcinogens (that act on the same target organ), as defined in the AOC SOW, USEPA guidance (USEPA, 1991a), and by IEPA (1998). The target risk levels used for the identification of COCs are based on USEPA guidance and Illinois TACO guidance. Specifically, USEPA provides the following guidance (USEPA, 1991a):

  "Where the cumulative carcinogenic site risk to an individual based on reasonable maximum exposure for both current and future land use is less than 10^{-4}, and the non-carcinogenic hazard quotient is less than 1, action generally is not warranted unless there are adverse environmental impacts." and, "The upper boundary of the risk range is not a discrete line at 1 x 10^{-4}, although EPA generally uses 1 x 10^{-4} in making risk management decisions. A specific risk estimate around 10^{-4} may be considered acceptable if justified based on site-specific conditions."

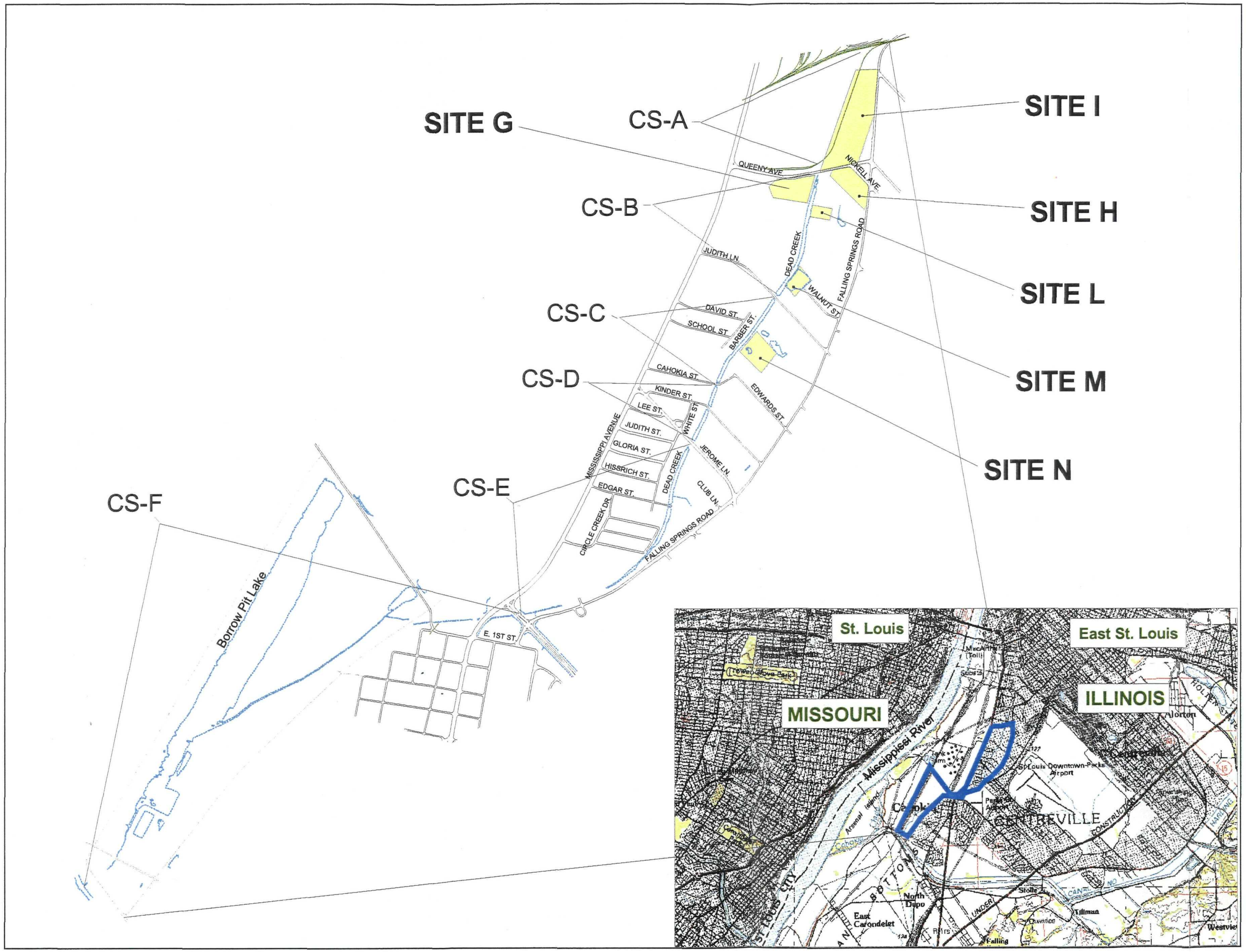
IEPA provides the following summary for the evaluation of cumulative risk for carcinogens (IEPA, 1998, Fact Sheet 13: Mixture Rule):

"The cumulative risk of carcinogenic contaminants attacking the same target must not exceed 1 in 10,000 [10^{-4}]. Therefore, the risk from all on-site similar acting carcinogens must be added together. If this cumulative risk level is greater than 1 in 10,000, corrective action must be taken to reach an acceptable risk level."

Within any of the steps of the risk evaluation process described above, assumptions must be made due to a lack of absolute scientific knowledge. Some of the assumptions are supported by considerable scientific evidence, while others have less support. The assumptions that introduce the greatest amount of uncertainty in this risk evaluation are discussed in Section 6.0.

- Section 7.0 – Short-Term Risk Assessment. The results of the short-term risk assessment, as described above, are presented in this section.
- Section 8.0 – Summary and Conclusions. This section presents a summary of the results of the baseline and short-term HHRAs. COCs are further evaluated in this section, and remedial goals (RGs) are calculated.
- Section 9.0 – This section presents the references used in the text.

Tables and figures follow each section.



N

LEGEND

Site

Water Body

Roads

CS-A Dead Creek Segment Designations

FIGURE 1-1

Sauget Area 1 Study Area

Sauget Area 1
EE/CA and RI/FS
Volume II
Human Health Risk Assessment

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2.0 SITE CHARACTERIZATION

This HHRA addresses data from environmental samples collected in accordance with the SSP from the areas of Sauget Area 1 identified in the AOC. Specifically, the EE/CA for Sauget Area 1 addresses waste, soil, surface water, sediment and air in the following areas:

- Sites G, H, I, L, M, and N
- Potentially impacted areas:
    - Dead Creek Segments (CS): CS-B, CS-C, CS-D, CS-E, and CS-F
    - Undeveloped, commercial and/or residential properties adjacent to these creek segments

The RI/FS for Sauget Area 1 addresses groundwater in the following areas:

- Sites and areas downgradient of the sites
- Private wells along Walnut Street and Judith Lane in Cahokia, IL

2.1 Study Area Description

Figure 1-1 presents the study area addressed by the EE/CA and RI/FS. industrial waste

As discussed in Sections 1.0 and 2.0 of the SSP, Sites G, H, I, L, M and N contain wastes that came from a wide variety of municipal and industrial sources. Site M is a fenced former sand borrow pit that is now filled with water and is hydrologically connected to Dead Creek. Site G is a fill area stabilized by USEPA in an emergency response that solidified organic wastes, placed a temporary soil cover over the site, and controlled site access by the installation of a fence. Recent inspection indicates that the site and fence are still stable. Recent inspection of Site H indicated that the site is stable with a vegetative cover and no exposed wastes at the surface. Site L also appears to be stable. It is covered with cinders and is located in a vegetated field. Site N reportedly contains construction rubble. Site I was originally used as a sand and gravel pit that received industrial and municipal wastes. The site is currently graded and covered with crushed stone and used for equipment and truck parking.

Dead Creek is an intermittent urban stream that bisects Sauget Area 1, passing through areas of commercial land use, areas of open land, and areas of residential land use, and eventually discharges to Borrow Pit Lake and Prairie DuPont Creek. The Borrow Pit Lake was formed as the result of the excavation of borrow material in the mid-1950's for local construction, including the levy.

The northern portion of the study area is an industrial area. Land use south of Area L is mixed undeveloped, commercial and residential. Groundwater is not used as a source of drinking water in the area. Both the Village of Sauget and the Village of Cahokia have in effect ordinances that prohibit the use of groundwater as a potable water supply. Copies of these ordinances are presented in Appendix S. However, there are some private wells in the area that may be used for outdoor household activities.

2.2 Sediment Removal Action

On May 31, 2000, the USEPA issued a Unilateral Administrative Order (UAO) to Monsanto Company and Solutia Inc. (Docket No. V-W-99-C-554) pursuant to section 106(a) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 as amended, 42 U.S.C. Section 9606(a). The Order requires the following response activities at Sauget Area 1 Creek Segments B and Site M and Creek Segments C, D and E and the portion of Creek Segment F between Creek Segment E and Route 3, which are located in Sauget and Cahokia, Illinois:

- Preparation of a Time Critical Removal Action Work Plan;
- Implementation of the Removal Action in accordance with the Work Plan to mitigate the threats posed by presence of contamination in Dead Creek sediments and certain adjacent soils and their potential migration via overflow and flood waters from the Site;
- Removal of materials from CS-B (creek sediments, creek bed soils and flood plain soils); CS-C, D, E, and a portion of F (non-native creek sediments only); and Site M (pond sediments and pond bottom soils) in Sauget Area 1, while minimizing adverse impacts to area wetlands and habitat;
- Proper handling, dewatering, treatment and placement of such materials in the on-site Containment Cell;
- A plan for management of Dead Creek storm water during the removal action;
- Sampling and analysis of areas where materials has been removed, for the purpose of defining remaining contamination;
- Placement of membrane liner material over CS-B and in all other excavated areas where, based on post-removal sample results, such liner is determined to be necessary; and
- Design of a containment cell that will provide adequate protection to human health and the environment.

The Order requires Solutia to conduct these removal activities to abate a potential imminent and substantial endangerment to the public health, welfare or the environment that may be presented by the actual or threatened release of hazardous substances at or from the site.

Therefore, environmental data from Site M and Dead Creek segments CS-B, CS-C, CS-D, CS-E, and a portion of CS-F have not been included in the risk assessment.

Conceptual Site Model

To guide identification of appropriate exposure pathways for evaluation in the risk assessment, a conceptual site model (CSM) for human health was developed. The purpose of the CSM is to identify source areas, potential migration pathways of constituents from source areas to environmental media where exposure can occur, and to identify potential human receptors. The CSM is meant to be a "living" model that can be updated and modified as additional data become available.

The initial CSM for the site is presented in Figure (Appendix A) 2-1, and was used to guide the investigation presented in the SSP and the COPC selection process in Section 3.0. An updated CSM is presented in Section 5.0, based on the data evaluation and COPC selection conducted in Section 3.0.

3.0 DATA EVALUATION AND HAZARD IDENTIFICATION

The purpose of the data evaluation and hazard identification process is two-fold: 1) to evaluate the nature and extent of release of constituents present at the site; and 2) to select a subset of these constituents identified as COPCs for quantitative evaluation in the risk assessment. This step of the risk assessment involves compiling and summarizing the data for the risk assessment, and selecting COPCs based on a series of screening steps.

3.1 Data Evaluation

The HHRA was conducted using validated data collected from the site in support of the SSP. Data used in the HHRA are presented in the Data Validation Report (Solutia, 2000a) and the Field Sampling Report (Solutia, 2000b).

3.1.1 Areas and Media

The SSP for Sauget Area 1 was designed to investigate three major areas of the Sauget Area 1 study area:

- Sites G, H, I, L, M, and N;
- Dead Creek and its environs including creek segments CS-B, CS-C, CS-D, CS-E, and CS-F, which includes the Borrow Pit Lake; and
- The residential/commercial/undeveloped areas adjacent to Dead Creek, evaluated as Transects 1, 2, 3, 4, 5, 6, and 7.

Of the data collected in support of the SSP, analytical data for use in the HHRA are available for the following media:

- Site shallow groundwater;
- Site downgradient alluvial groundwater;
- Shallow groundwater southwest of the sites;
- Shallow groundwater in the vicinity of Walnut Street and Judith Lane;
- Groundwater from private wells in the vicinity of Walnut Street and Judith Lane;
- Site surface soil (0-0.5 feet below ground surface (bgs));
- Residential area surface soil;

- Residential area subsurface soil (0.5-6 feet bgs);
- Dead Creek sediment;
- Borrow Pit Lake sediment;
- Dead Creek surface water;
- Borrow Pit Lake surface water;
- Fish tissue from Borrow Pit Lake; and
- 24-hour air samples at Sites G, H, I, and L.

Analytical data for use in the HHRA from background or reference locations are available for the following media:

- Surface soil;
- Subsurface soil;
- Groundwater;
- Surface water;
- Sediment;
- Fish tissue; and
- Upwind air.

Figure 3-1 shows the study area and the sample collection locations for soil, groundwater, surface water and sediment (excluding the reference or background areas).

3.1.2 Analytes

The SSP identified the suites of analytes for each medium. For ease of discussion here, the analytes included in the risk assessment are identified as follows:

- Full suite of analytes – volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, mercury, cyanide, polychlorinated biphenyls (PCBs), pesticides, and herbicides;
- Dioxins – dioxins and furans; and
- Industry-specific analytes – PCBs, total petroleum hydrocarbons (TPH), copper, zinc, fluorides, phosphorous and ortho-phosphate. [Note – of these analytes, only the data for PCBs were

validated for inclusion in the HHRA. Data packages are available for the other analyses, but validation was not necessary to perform the HHRA.]

All analytical data collected in support of the SSP were compiled and tabulated in a database for statistical analysis. These data are presented in the Data Validation Report (Solutia, 2000a).

3.1.3 Summary Statistics

The data for each area and medium were summarized for use in the risk assessment. The following guidance documents were used to develop the summary statistics:

- Risk Assessment Guidance for Superfund: Volume I – Human Health Evaluation Manual, Part A (U.S. EPA, 1989a).
- Supplemental Guidance to RAGS: Calculating the Concentration Term (U.S. EPA, 1992a).

The steps used to summarize the data by area and medium for use in identifying COPCs in the screening process presented in this section are discussed here. The additional steps used to summarize the data for identifying exposure point concentrations (EPCs) are presented in Section 5.0.

The steps used to summarize the data by area and medium are as follows:

Treatment of Duplicates: Data for samples and their duplicates were averaged before summary statistics were calculated, such that a sample and its duplicate were treated as one sample for calculation of summary statistics (including maximum detection and frequency of detection).

Treatment of Non-Detects:

- Summary statistics were not calculated for constituents that were not detected in a particular area/medium.
- Where constituents were detected in some samples and not in others in a particular area/medium, ½ the reported sample quantitation limit (SQL) was used as a proxy concentration for the samples reported as nondetect (USEPA, 1989b).
- For all non-detects for which ½ the SQL was calculated, ½ the SQL was compared to the maximum detected concentration for that area and medium. Where ½ the SQL was greater than the maximum detected concentration in a particular area/medium, the SQL value was not used in the calculation of summary statistics for that constituent in that area and medium (USEPA, 1989a).

Frequency of Detection: The frequency of detection is reported as a percentage based on the total number of samples analyzed and the number of samples reported as detected for a specific constituent. The number of samples used to calculate statistics reflects the treatment of non-detects described above.

Minimum Detected Concentration: This is the minimum detected concentration for each constituent/area/medium combination, after duplicates have been averaged.

Maximum Detected Concentration: This is the maximum detected concentration for each constituent/area/medium combination, after duplicates have been averaged.

Average Concentration: This is the arithmetic mean concentration for each constituent/area/medium combination, after duplicates have been averaged and non-detects have been evaluated.

Appendix B presents the summary statistics by area and medium. For each area/medium combination, two tables are presented: the first presents the summary statistics, and the second identifies the samples used in the calculation of the summary statistics.

3.1.4 Sample Collection and Data Evaluation by Area and Medium

Data sets for each medium are described below.

3.1.4.1 Groundwater

Figure 3-2 identifies the residential non-potable use wells and the groundwater sample locations evaluated in the risk assessment.

Transects - Analytical data for shallow groundwater in the Walnut Street/Judith Lane residential area, as well as for four domestic wells in this area were evaluated in the risk assessment. These data include the full suite of analytes and dioxins.

For the purposes of the risk assessment, shallow groundwater is defined as samples collected between 0 and 30 feet bgs. This depth interval has been selected based on potential construction activities and potential for volatilization to indoor and/or outdoor air, as discussed more fully in Section 5.0. The screening interval of the wells in the residential areas is unknown, however samples from these wells were included in the risk assessment.

Sites - Data for shallow groundwater collected from locations within the sites, the downgradient alluvial aquifers, and shallow groundwater southwest of the sites, as identified in the SSP, were evaluated in the risk assessment. These data include the full suite of analytes and dioxins.

Collection of groundwater samples downgradient of the sites using push sampling methods per the SSP began at the water table, and samples were collected at approximately 10-foot intervals down to bedrock. Groundwater sample collection with a site/fill area began below the lower depth of the waste.

Screening of the groundwater data to identify COPCs was conducted on a location-by-location basis, therefore, summary statistics are not presented for groundwater in Appendix B.

3.1.4.2 Soil

Transects - Figure 3-3 identifies the location of each soil sample for each transect. Surface (0-0.5 feet bgs) and subsurface (0.5-6 feet bgs) soil samples were collected from undeveloped areas along seven transects as identified in the SSP in the residential/commercial/undeveloped area adjacent to Dead Creek and analyzed for the full suite of analytes and dioxins. These Undeveloped Area Soil sample identification numbers use the following format: undeveloped area soil designator – transect number – location – depth interval, e.g., UAS-T7-S4-0-0.5FT. Only surface soil sample identification numbers are provided on Figure 3-3 – all subsurface soil samples are co-located and distinguished by the sample depth interval "3-6FT".

Based on the transect analytical results, additional surface and subsurface soil samples were collected from three residences along each of Transects 1 through 6 and two residences along Transect 7 and analyzed for the full suite of analytes and dioxins. These samples are identified as Developed Area Soils, and follow the same sample identification scheme as above, but using the developed area soil designator of "DAS." Figure 3-3 also provides the developed area soil sample locations.

Sites - Figure 3-4 identifies the location of each surface soil sample for each site. Surface soil (0-0.5 feet bgs) samples were collected in each site. These samples were analyzed for the full suite of analytes and dioxins. The site soil sample identification numbers have the following format: site – location – depth interval, e.g., WASTE-N-B2-0-0.5FT.

Appendix B provides the summary statistics for Site and Transect soils and a listing of each sample included in each area/medium combination evaluated.

3.1.4.3 Sediment

Sediment sample locations included in the risk assessment are identified on Figure 3-5, and Appendix B presents the summary statistics. Study area sediment samples from locations not included in the sediment removal action (discussed in Section 2.0) are located in the lower reach of Dead Creek (downstream of Route 3) and in the Borrow Pit Lake. This area is being evaluated as one area in the risk assessment.

Per the SSP, sediment samples were analyzed for the industry-specific constituents, while a subset were analyzed for the full suite of analytes and dioxins. Samples analyzed for the industry-specific analytes are identified by the designator "FASED" followed by either "CSF" for Creek Segment F or "BPL" for Borrow Pit Lake, and then a location and depth designator. The remaining sediment samples have either a "BPL-ESED" designator, or a "SED-CSF" designator.

3.1.4.4 Surface Water

Surface water sample locations included in the risk assessment are identified on Figure 3-5, and Appendix B presents the summary statistics. Study area surface water samples from locations not included in the sediment removal action (discussed in Section 2.0) are located in the lower reach of Dead Creek (downstream of Route 3) and in the Borrow Pit Lake. This area is being evaluated as one area in the risk assessment.

The surface water samples were analyzed for the full suite of analytes and dioxins, and have sample designators of "SW" followed by either "CSF" for Creek Segment F or "BPL" for Borrow Pit Lake, and then a location designator.

3.1.4.5 Fish Fillet

Fish fillet samples were collected from Borrow Pit Lake and analyzed for the full suite of analytes (with the exception of VOCs) and dioxins. Three white crappie composite fish fillet samples and two white bass fillet samples were collected. Since it was difficult to obtain sufficient tissue mass from a single species, white crappie fillets were analyzed for VOCs, SVOCs, metals, mercury, cyanide and PCBs, and white bass fillets were analyzed for pesticides and herbicides.

3.1.4.6 Air

Air samples were collected in the vicinity of Sites G, H, I, and L and analyzed for VOCs, SVOCs, PCBs, dioxins, and metals. Air samples were collected over a 24-hour period during hot, dry conditions (September, 1999) conducive to air emissions of dust and volatiles. To perform the HHRA, these data were compared to chronic and, if appropriate, to subchronic or acute criteria as discussed in the HHRA Workplan (Appendix A).

3.2 Methodology for Selection of Constituents of Potential Concern

COPCs are a subset of the complete list of constituents detected in site media that are carried through the quantitative risk assessment process. Selection of COPCs focuses the analysis on the most likely risk "drivers." As stated in USEPA guidance (USEPA, 1993a):

> "Most risk assessments are dominated by a few compounds and a few routes of exposure. Inclusion of all detected compounds at a site in the risk assessment has minimal influence on the total risk. Moreover, quantitative risk calculations using data from environmental media that may contain compounds present at concentrations too low to adversely affect public health have no effect on the overall risk estimate for the site. The use of a toxicity screen allows the risk assessment to focus on the compounds and media that may make significant contributions to overall risk."

Several factors are typically considered in selecting COPCs for a site, including natural background, frequency of detection, and toxicity, including essential nutrient status. Each of these evaluation steps is called a "screening step." Risk calculations are conducted using the COPCs identified in these steps.

The steps used to identify COPCs are presented below.

3.2.1 Evaluation of Frequency of Detection and Essential Nutrient Status

Per the HHRA Workplan (Appendix A), a frequency of detection screen was conducted on each medium (e.g., sediment, surface soil, etc.). According to this screening step, constituents that are detected in fewer than 5% of samples, provided 20 samples are available, would not be included as COPCs, though some of these constituents would be retained as COPCs based on professional judgment, considering factors such as the presence of a hotspot. However, based on the frequency of detection information presented in the summary statistics in Appendix B, no constituents were excluded from consideration as a COPC based on the frequency of detection screen. In addition, essential nutrients (i.e., calcium, iron, magnesium, sodium and potassium) were not included as COPCs (HHRA Workplan, and USEPA, 1989a).

3.2.2 Comparison to Background

Background samples were collected in the vicinity of the site to provide information on naturally-occurring levels of constituents typical for the local area. The purpose of comparing site conditions to local background is to determine if site concentrations of constituents are representative of background concentrations, which, therefore, should not be included in risk calculations. Background comparisons were conducted for each medium using site-specific background data and background concentrations.

Three background groundwater samples were collected in upgradient locations, and three surface soil and three subsurface soil samples were collected at background locations, all identified in the SSP. These background locations are presented on Figure 3-6. Four surface water samples, four sediment samples and four fish fillet samples were collected from reference locations, as there are no upgradient locations in Dead Creek outside of the study area (see the Ecological Risk Assessment in Volume III of this report).

The procedure for determining whether a constituent concentration is consistent with background follows that developed by USEPA Region 4 (USEPA, 2000a) and presented in the HHRA Workplan (Appendix A). Maximum detected concentrations of constituents in environmental media at the site were compared to two times the arithmetic mean site-specific background concentration. USEPA Region 4 states that although RAGS (USEPA, 1989a) allows the use of statistics in data evaluation, statistics may not be sufficiently conservative at this stage of the risk evaluation; and in most cases, there are not a sufficient number of samples for conducting a statistical analysis. Therefore, if maximum concentrations of inorganic constituents in an area are found to be less than two times the average background concentrations, then those constituents are eliminated from quantitative evaluation in the risk assessment. Constituents whose maximum detected concentrations are above the defined background levels and not identified as an essential nutrient were retained for evaluation in the next step of the hazard identification process (Toxicity Screen).

The calculation of background concentrations is presented in Appendix D. It should be noted that arsenic in soil in a subset of the sites and transects was the only constituent eliminated as a COPC based solely on the background screening step.

3.2.3 Toxicity Screen

A toxicity screen was performed in accordance with USEPA Region 5 guidance (USEPA, 1998b) and IEPA regulations (IEPA, 1998).

3.2.3.1 Sources of Screening Criteria

USEPA Region 5 guidance identifies the following three sources as appropriate screening levels for soil, in order of preference:

1) Most recent generic soil screening levels (SSLs) developed and presented in Appendix A of the Soil Screening Guidance (USEPA, 1996b). The SSLs are based on ingestion and inhalation (direct contact) and soil-to-groundwater exposure pathways for a residential scenario.
2) Site-specific SSLs derived using the methodology outlined in the above reference.

3) Most recent USEPA Region 9 Preliminary Remediation Goals (PRGs; USEPA, 1999).

The IEPA TACO program (IEPA, 1998) is very similar to that outlined in the SSL guidance (USEPA, 1996a) in that it provides Tier I criteria based on direct contact (ingestion and inhalation) and the soil-to-groundwater pathway. In fact, the TACO Tier I criteria have been developed based on the USEPA SSL guidance. However, the TACO Tier I criteria are more comprehensive because values are provided for a longer list of constituents, and Tier I criteria are available for both residential and industrial scenarios.

Therefore, IEPA TACO Tier I criteria were used for the identification of COPCs for soil and groundwater for quantitative evaluation in the risk assessment. Where IEPA TACO Tier I criteria (IEPA, 1998) were not available, structural similarity was used to assign a surrogate TACO Tier 1 criterion, and where this was not possible USEPA Region 9 PRGs (1999) were used. The screening values are presented in Appendix C.

Residential values were used to identify COPCs for residential soils and sediments, and industrial values were used to evaluate fill area soils. Region 9 PRGs were used as screening criteria for ten constituents detected in soil.

The TACO program also provides screening criteria for the groundwater ingestion component of the soil to groundwater pathway that were used here. These latter values conservatively address leaching of constituents from soils to underlying groundwater.

The IEPA TACO program provides Tier 1 groundwater remediation objectives for two classes of groundwater: Class I and Class II. Class I is potable resource groundwater, and Class II applies to all other groundwater. The derivation of the Class I and Class II criteria are discussed in Appendix C. Class II criteria were developed to allow for facile treatment of groundwater to meet Class I criteria, and to be protective of agricultural uses of groundwater. Thus, the Class II criteria are considered to be protective of incidental groundwater exposures. It must be noted that neither IEPA or USEPA consider TACO to be an ARAR - it is therefore used in this report only to provide ~~comp~~ relative comparisons

The groundwater in the study area meets the Class I: Potable Resource Groundwater criteria set forth in 35 Ill. Adm. Code 620. However, as noted in the HHRA Workplan, a drinking water scenario would only be included in the risk assessment if it was determined that groundwater was being used as a sole source of drinking water for any of the residences in the study area that are downgradient of the fill areas. Private wells in the study area are either not used or are used for outdoor household activities. In addition, ordinances are in effect in the Village of Sauget and the Village of Cahokia that prohibit the use of groundwater as a potable water supply (these are presented in Appendix S). Therefore, a drinking water scenario is not included in the risk assessment. To identify COPCs for potential incidental exposures to groundwater (i.e., non-drinking water scenarios), the Class II criteria were used. Region 9 PRGs for tap water were used as screening criteria for fourteen constituents detected in groundwater.

IEPA TACO Tier I values are not available for surface water, fish tissue, or air. Hence, surface water data were compared to the Class II groundwater criteria, as surface water exposures for evaluation in the risk assessment involve incidental contact with surface water, and not a drinking water exposure. Fish tissue data were compared to the USEPA Region 3 Risk-Based Concentrations (RBCs) for fish (USEPA, 2000b). As fish tissue data were available for evaluation, a comparison of surface water data to human health Ambient Water Quality Criteria (AWQCs) for fish ingestion (USEPA, 1998c) was not required. Air concentrations were compared to USEPA Region 9 PRGs (USEPA, 1999).

The toxicity criteria available at the time of the HHRA Workplan (Appendix A) preparation were used to develop data quality levels (DQLs), which were used to identify appropriate practical quantitation limits (PQLs) for laboratory methods for the analytical program addressed in the Quality Assurance Project Plans (QAPPs) for the site (see Volumes 2B and 3B of the SSP).

As noted in the HHRA Workplan, the PRGs and RBCs are periodically updated by USEPA. The most current criteria available at the time of the screening were used in the selection of COPCs. These are the Region 3 RBCs dated October 5, 2000 and the Region 9 PRGs dated October 1, 1999. The screening was conducted in October, 2000. The Region 9 PRGs were updated in the fall of 2000; the date on the Region 9 PRG update is November 1, 2000 (USEPA, 2000d). A review of the PRG values used in the screening indicates that only the value for lead in industrial soil has changed significantly (from 1000 mg/kg to 750 mg/kg). Therefore, the latter value was used in the industrial soil screening, though all of the screening tables by necessity refer to the 1999 PRGs.

The as-published sources of screening criteria are presented in the HHRA Workplan Appendices. The TACO Tier I values are presented in Appendix (Workplan) B, and the current AWQCs are presented in Appendix (Workplan) E. Because the USEPA Region 9 PRGs and the USEPA Region 3 RBCs have been updated since the submittal of the workplan, the current versions of these values used in this risk assessment have been included in the workplan appendices. Therefore, the current (2000d) USEPA Region 9 PRGs are presented in Appendix (Workplan) C, the current USEPA Region 3 RBCs (2000b) are presented in Appendix (Workplan) D.

Appendix C presents the specific screening values used for the residential soil – direct contact screen, the industrial soil – direct contact screen, the soil to groundwater pathway screen, the groundwater and surface water screen, the air screen, and the fish tissue screen used in this risk assessment.

3.2.3.2 Screening Methodology

Constituents in an area/medium with maximum concentrations less than or equal to the toxicity screening criteria were not included as COPCs. Where no COPCs are identified for an area/medium, that area/medium is not evaluated quantitatively in the HHRA.

3.3 Hazard Identification

This section presents the results of the COPC selection by medium and area. COPCs selected here are included in subsequent risk calculations.

3.3.1 Soils

Data for transect soils were compared to background, residential and industrial direct contact screening values as well as to the soil to groundwater screening values. Data for site soils were compared to background, industrial direct contact and the soil groundwater screening values. Calculation of background concentrations of constituents in soils is presented in Appendix D Table D-1 for subsurface soils and D-2 for surface soils. As noted previously, arsenic in a subset of transect and site soils is the only constituent to be eliminated as a COPC based solely on the comparison to background.

3.3.1.1 Residential Scenario Direct Contact Screen

Maximum constituent concentrations in surface soil in all seven transects and for Site N were compared to residential soil screening values for direct contact. The screening tables are presented in Appendix E.

Transects. No residential scenario COPCs were identified in surface soil in Transects 1 and 2. COPCs identified in surface soil for a residential scenario for Transects 3 through 7 are presented in Table 3-1.

Sites. COPCs identified in surface soil for a residential scenario for Site N are presented in Table 3-2.

3.3.1.2 Industrial Scenario Direct Contact Screen

Maximum constituent concentrations in surface soil and subsurface soil in all transects and surface soil in all sites were compared to industrial screening values for direct contact. The screening tables are presented in Appendix F.

Transects. No industrial scenario COPCs were identified in surface soil for Transects 1, 2 or 5. No industrial scenario COPCs were identified in subsurface soil for Transects 1, 2, 3, 5, or 7. COPCs identified in surface soil for an industrial scenario for Transects 3, 4, 6, and 7 are presented in Table 3-1. COPCs identified in subsurface soil for an industrial scenario for Transects 4 and 6 are also presented in Table 3-1.

Sites. No industrial scenario COPCs were identified in surface soil for Sites G and N. COPCs identified ~~in surface~~ soil for an industrial scenario for Sites H, I, and L are presented in Table 3-2.

3.3.1.3 Soil to Groundwater Pathway Screen

Maximum constituent concentrations in surface soil and subsurface soil in all transects and surface soil in all sites were compared to soil to groundwater pathway screening values. The screening tables are presented in Appendix G.

Transects. No soil to groundwater pathway COPCs were identified in subsurface soil in Transects 1, 2, and 5. As shown in Table 3-3, pentachlorophenol was identified as a COPC in all remaining transect soils. Selenium, dieldrin, beta-BHC and benzo(a)anthracene were each identified as a COPC once in transect soils. Of these, dieldrin was detected once in a residential area groundwater sample location (SGW-S1) and beta-BHC was detected once in a residential area groundwater sample location (SGW-S2), both below the groundwater screening values (Appendix H). The remaining constituents were not detected in the residential area groundwater.

What?

Sites. No soil to groundwater pathway COPCs were identified in surface soil in Site G. As shown in Table 3-4, pentachlorophenol was identified as a COPC in all remaining site soils. Dieldrin, beta-BHC and 4-chloroaniline were each identified as a COPC once in site soils, and selenium was identified twice.

3.3.1.4 Soil COPC Summary

No direct contact COPCs for either a residential or industrial scenario were identified for Transect 1, Transect 2, or Site G. Therefore, surface and subsurface soils in these areas will not be further evaluated in the risk assessment.

The majority of the COPCs identified in surface and subsurface soils in the transects and in Site N (five of seven) are polycylic aromatic hydrocarbons (PAHs). Of the remaining two COPCs, dieldrin was identified as a COPC in surface soil only in Transect 5 for the residential scenario, and arsenic was identified as a COPC in surface soil only in Transect 7 for both the residential and industrial scenarios.

PAHs are common combustion products and are found in grilled foods, charcoal, and in motor oils and asphalt paving (ATSDR, 1995). A paper entitled "Background Levels of Polycyclic Aromatic Hydrocarbons (PAH) and Selected Metals in New England Urban Soils" (Bradley et al., 1994) investigated the occurrence of PAHs in soils in three New England towns: Boston, MA; Providence, RI; and Springfield, MA. Samples were collected in non-industrial areas. PAH concentrations were consistently higher than residential screening criteria. Higher PAH concentrations were found near roadways and near telephone poles. A copy of the paper is presented in Appendix D – Background Calculations. Comparison of the PAH concentrations in this paper with those concentrations detected in Transect 3, 4, 5, 6, and 7 surface soils indicates that the transect concentrations are similar to those presented in the paper, i.e., are consistent with urban background.

Arsenic was identified as a COPC in surface soils in Transect 7. Of the nine surface soil samples collected in this transect, eight had concentrations ranging from 6.2 to 8.1 mg/kg, below the site-specific background concentration of 19 mg/kg. However, one sample in Transect 7 (UAS-T7-S1-0-0.5FT) had an arsenic concentration of 34 mg/kg. Because this maximum detected value is greater than the background concentration, arsenic was identified as a COPC in Transect 7. This concentration is within the range of arsenic concentrations detected in eastern U.S. soils of 0.1 to 73 mg/kg (ATSDR, 1992).

IEPA has published a report entitled "A Summary of Selected Background Conditions for Inorganics in Soil" (IEPA, 1994). This report is presented here in Appendix D. In this publication, background concentrations are reported for soils within counties in metropolitan areas and soils in counties outside of metropolitan areas. Within metropolitan areas, 114 soil samples were evaluated; arsenic concentrations ranged from 1.1 to 24 mg/kg, with a mean concentration of 7.4 mg/kg and a median concentration of 7.2 mg/kg. Outside of metropolitan areas, 120 soil samples were evaluated; arsenic concentrations ranged from 0.35 to 22.4 mg/kg, with a mean concentration of 5.9 mg/kg and a median concentration of 5.2 mg/kg. The Illinois TACO program (IEPA, 1998) uses the median concentrations as its point estimates for the statewide area background approach for concentrations of inorganics in soils; this is a conservative approach as equal numbers of samples in the background population had higher concentrations than the reported median value as those with lower concentrations. Sauget Area 1 is in St. Clair County, which is identified as a metropolitan area county in the TACO program. All detected concentrations of arsenic in soil were within the range of arsenic concentrations detected in metropolitan areas (1.1 to 24 mg/kg) with the exception of the single sample noted above. As provided for in the TACO program, an alternative statistical approach for background was used in the HHRA, as identified in the HHRA Workplan. The site-specific background concentration for arsenic of 19 mg/kg is also within the range of arsenic concentrations detected in background locations presented in the IEPA report.

Therefore, although the majority of the COPCs identified in the transect soils are likely consistent with background concentrations, they have all been quantitatively evaluated in the risk assessment.

The COPCs identified in the industrial scenario screen for surface soils in the fill areas are PAHs, arsenic, and copper, PCBs and tetrachlorodibenzo-p-dioxin (TCDD) equivalents. These are all quantitatively evaluated in the risk assessment.

3.3.2 Groundwater

The selection of COPCs for groundwater was conducted on a location-by-location basis. The screening tables are presented in Appendix H, which lists each well included in the analysis. Screening intervals and/or sample depths are also included where known.

As noted above and in the HHRA Workplan, a drinking water scenario would only be included in the risk assessment if it was determined that groundwater was being used as a sole source of drinking water for any of the residences in the study area that are downgradient of the fill areas. Private wells in the study area are either not used or are used for outdoor household activities, and ordinances are in effect that prohibit the use of groundwater as a potable water supply source (Appendix S). Therefore, a drinking water scenario is not included in the risk assessment. COPCs were identified to evaluate potential incidental exposures to groundwater (i.e., non-drinking water scenarios), including incidental contact by a construction worker that may excavate to a depth where groundwater would be exposed in the excavation, or potential volatilization of VOCs through the soil column to indoor or outdoor air. As noted above, the groundwater concentrations are compared to TACO Tier 1 Class II Groundwater Remediation Objectives (presented in Appendix C).

A 30-foot bgs excavation depth is assumed as some sewer lines in the area are located at that depth. Moreover, volatilization from groundwater through the soil column to indoor and/or outdoor air is generally assumed to occur up to depths of up to 15 feet bgs (MADEP, 1995). Therefore, wells and or well samples with screening intervals or sample collection depths between 0 and 30 feet bgs were included in the evaluation.

Data from 34 groundwater sampling locations were included in the evaluation: 19 existing wells (those beginning with EE and EGG designations), 11 push sampling locations installed in support of the SSP (those beginning with AA and SW designations), and four existing residential area non-potable use wells (those beginning with DW designations).

The results of the COPC selection are presented in Table 3-5. COPCs were identified in 14 of the 34 groundwater sampling locations. Five locations have only one or two COPCs identified. Seven locations have between six and 11 COPCs identified, and two locations have 17 and 19 COPCs identified; these are in Sites G and H, respectively. There appears to be no clear pattern of COPCs between locations. A total of 42 COPCs were identified in the 14 locations combined. Of these, 12 are VOCs. Of the four residential area non-potable use wells, a single COPC, lead, was identified in only one well (DW-MCDO). This is the only COPC identified in the approximately 10 locations south of Site

L, and lead was not identified as a COPC in any other groundwater sampling location included in the evaluation.

3.3.3 Sediment

Maximum constituent concentrations in sediment in the combined CS-F/Borrow Pit Lake area were compared to residential soil screening values for direct contact, per the HHRA Workplan. The screening table is presented in Appendix E.

Two COPCs were identified in sediment, as shown in Table 3-6; arsenic and PCBs.

3.3.4 Surface Water

Maximum constituent concentrations in surface water in the combined CS-F/Borrow Pit Lake area were compared to the screening values for surface water, which are the Class II groundwater criteria. The screening table is presented in Appendix I. Based on this screen, no COPCs were identified in surface water. Therefore, surface water is not evaluated further in the risk assessment.

3.3.5 Fish Fillet

The selection of COPCs for fish fillet samples was conducted on a sample-by-sample basis. Fish tissue concentrations were compared to the USEPA Region 3 RBCs (USEPA, 2000b). The screening tables are presented in Appendix I. The background calculation is also presented in Appendix I.

One COPC was identified in fish tissue – arsenic, as shown on Table 3-6. Arsenic was detected in only one of the three fish tissue samples analyzed for arsenic.

3.3.6 Air

Ambient air sampling was conducted at Sites G, H, I and L to determine the tendency of site constituents to enter the atmosphere and local wind patterns. At Site G, air samples were collected at two upwind and two downwind locations. At Sites H, I, and L, air samples were collected at one upwind and two downwind locations. Figure 3-9 identifies the ambient air sampling locations.

Air samples were analyzed for VOCs, SVOCs, PCBs, dioxins, and metals. Appendix J presents the upwind or background air concentrations and the comparison of each downwind sample concentration to upwind concentrations and to the PRGs for ambient air (USEPA, 1999).

Table 3-7 provides the summary for the COPCs identified in air. It should be noted that 4-methyl-2-pentanone, acetone and methylene chloride are all common laboratory contaminants, however, review of the field blank data did not clearly indicate a problem with sample collection or analysis. Methylene chloride was identified as a COPC in all four sites. However, the numerical results are sporadic (see Table 3-7 and Appendix J). For example, in each downwind sample pair, methylene chloride was detected at a high concentration in one sample, and not detected or detected at a much lower concentration in the second downwind sample. As samples were collected from all areas on the same day, such spikes would not be expected. Moreover, methylene chloride was not identified as a COPC in site soils or groundwater. Therefore, although it is not indicated by the sample blank evaluations, laboratory contamination seems to be the most likely source of methylene chloride in these samples.

These data are evaluated further in Section 7.0.

TABLE 3-1
SUMMARY OF CONSTITUENTS OF POTENTIAL CONCERN
TRANSECTS - DIRECT CONTACT
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Residential Scenario					Industrial Scenario					
	Surface Soil					Surface Soil				Subsurface Soil	
	T3	T4	T5	T6	T7	T3	T4	T6	T7	T4	T6
Arsenic	--	--	--	--	X	--	--	--	X	--	--
Benzo(a)anthracene	--	X	--	X	X	--	--	--	--	X	--
Benzo(a)pyrene	X	X	X	X	X	X	X	X	X	X	X
Benzo(b)fluoranthene	X	X	--	X	X	--	--	--	--	X	--
Dibenzo(a,h)anthracene	X	X	X	X	X	--	X	--	--	X	--
Dieldrin	--	--	X	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	--	X	--	X	X	--	--	--	--	--	--
Total:	**3**	**5**	**3**	**5**	**6**	**1**	**2**	**1**	**2**	**4**	**1**

Notes:
-- This constituent was not identifed as a constituent of potential concern based on this scenario.
T - Transect.

TABLE 3-2
SUMMARY OF CONSTITUENTS OF POTENTIAL CONCERN
SITES - DIRECT CONTACT
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Residential Scenario	Industrial Scenario		
Constituent	**N**	**H**	**I**	**L**
Arsenic	--	X	--	X
Benzo(a)pyrene	X	--	X	X
Copper	--	--	X	--
Dibenzo(a,h)anthracene	X	--	--	X
Total 2,3,7,8-TCDD TEQ	--	X	X	--
Total PCBs	--	X	X	X
Total:	**2**	**3**	**4**	**4**

Notes:
-- This constituent was not identifed as a constituent of potential concern based on this scenario.

TABLE 3-3
SUMMARY OF CONSTITUENTS OF POTENTIAL CONCERN
TRANSECTS - SOIL-TO-GROUNDWATER
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Soil-to-Groundwater Pathway										
	Surface Soil							Subsurface Soil			
Constituent	**T1**	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**	**T3**	**T4**	**T6**	**T7**
Benzo(a)anthracene	--	--	--	--	--	--	--	--	X	--	--
beta-BHC	--	--	--	--	--	X	--	--	--	--	--
Dieldrin	--	--	--	--	X	--	--	--	--	--	--
Pentachlorophenol	X	X	X	X	X	X	X	X	X	X	X
Selenium	--	--	X	--	--	--	--	--	--	--	--
Total:	**1**	**1**	**2**	**1**	**2**	**2**	**1**	**1**	**2**	**1**	**1**

Notes:
-- This constituent was not identifed as a constituent of potential concern based on this pathway.
T - Transect.

TABLE 3-4
SUMMARY OF CONSTITUENTS OF POTENTIAL CONCERN
SITES - SOIL-TO-GROUNDWATER
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Soil-to-Groundwater Pathway			
	H	I	L	N
4-Chloroaniline	--	X	--	--
beta-BHC	--	--	X	--
Dieldrin	--	X	--	--
Pentachlorophenol	X	X	X	X
Selenium	X	--	X	--
Total:	**2**	**3**	**3**	**1**

Notes:
-- This constituent was not identifed as a constituent of potential concern based on this pathway.

TABLE 3-5
SUMMARY OF CONSTITUENTS OF POTENTIAL CONCERN
GROUNDWATER - CHRONIC EXPOSURE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Site	Site G			Site H			Site I						Site L	RES
Constituent Location	EE-05	EEG-106	EEG-107	EE-01	EE-02	EE-03	AA-I-S1	AA-I-S2	EE-12	EE-13	EE-14	EE-15	EEG-109	DW-MCDO
1,1,2,2-Tetrachloroethane *	--	--	--	X	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	--	--	X	X	X	--	X	X	--	--	X	X	--	--
2,4,5-TP (Silvex)	X	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	--	--	--	X	X	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	--	--	X	--	X	--	--	--	--	--	--	--	X	--
2-Chlorophenol	--	--	X	--	--	--	--	--	--	--	--	--	--	--
2-Nitroaniline	--	--	--	--	X	--	--	--	--	--	--	--	--	--
3-Methylphenol/4-Methylphenol	--	--	X	--	--	--	--	--	--	--	--	--	--	--
4,4-DDE	--	--	--	--	--	--	--	--	X	--	--	--	--	--
4-Chloroaniline	X	--	X	X	X	--	X	X	X	--	X	--	X	--
4-Methyl-2-pentanone *	--	--	X	--	--	--	--	--	--	--	--	--	--	--
4-Nitroaniline	X	--	--	--	--	--	--	--	--	--	--	--	--	--
alpha-BHC	--	X	X	--	X	--	--	--	X	--	X	--	--	--
Antimony	--	--	--	--	X	--	--	--	--	--	--	--	--	--
Arsenic	--	--	--	--	X	--	--	--	--	--	--	--	X	--
Benzene *	X	--	X	X	X	--	X	X	X	--	X	--	X	--
Benzo(k)fluoranthene	--	--	--	--	--	--	--	X	--	--	--	--	--	--
beta-BHC	--	X	--	--	--	--	--	--	--	--	X	--	--	--
Cadmium	--	--	--	--	--	--	--	X	--	--	--	--	--	--
Carbazole	--	--	--	X	--	--	--	--	X	--	X	--	--	--
Chlorobenzene *	X	--	X	X	X	--	X	X	X	--	X	--	--	--
Chloroform *	--	--	--	--	X	--	--	--	--	--	--	--	X	--
Cis/Trans-1,2-Dichloroethene *	--	--	--	--	--	--	X	X	--	--	--	--	--	--
delta-BHC	X	--	X	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene *	--	--	--	X	--	--	--	--	--	--	--	--	--	--
Heptachlor	--	--	--	--	--	--	--	--	X	--	--	--	--	--
Heptachlor Epoxide	--	--	--	--	X	--	--	--	X	--	--	--	--	--
Lead	--	--	--	--	--	--	--	--	--	--	--	--	--	X
Molybdenum	X	--	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene *	X	--	X	X	X	--	--	--	--	--	--	--	--	--
Nickel	--	--	--	--	--	--	--	X	--	--	--	--	X	--
Nitrobenzene	--	--	--	--	X	--	--	--	--	--	--	--	--	--
Pentachlorophenol	--	--	X	X	X	--	--	--	--	--	X	--	--	--
Phenol	X	--	X	--	X	--	--	--	--	--	--	--	--	--
Tetrachloroethene *	--	--	X	--	--	--	--	--	--	--	--	--	--	--
Toluene *	--	--	X	--	--	--	--	--	--	--	--	--	--	--
Total PCBs	--	--	--	--	--	--	--	--	--	--	X	--	--	--
Total 2,3,7,8-TCDD TEQ	X	--	X	X	--	X	--	--	X	X	X	--	--	--
Trichloroethene *	--	--	X	--	X	--	--	X	--	--	--	--	--	--
Vanadium	--	--	X	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride *	--	--	X	--	--	--	X	X	--	--	--	--	--	--
Zinc	--	--	--	--	--	--	--	X	--	--	--	--	--	--
Total:	10	2	19	11	17	1	6	11	9	1	10	1	6	1

Notes:
-- This constituent was not identifed as a constituent of potential concern based on this scenario.
* Indicates volatile organic compound (VOC).
RES - Residential Non-Potable Use Well.

TABLE 3-6
SUMMARY OF CONSTITUENTS OF POTENTIAL CONCERN
SEDIMENT AND FISH TISSUE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

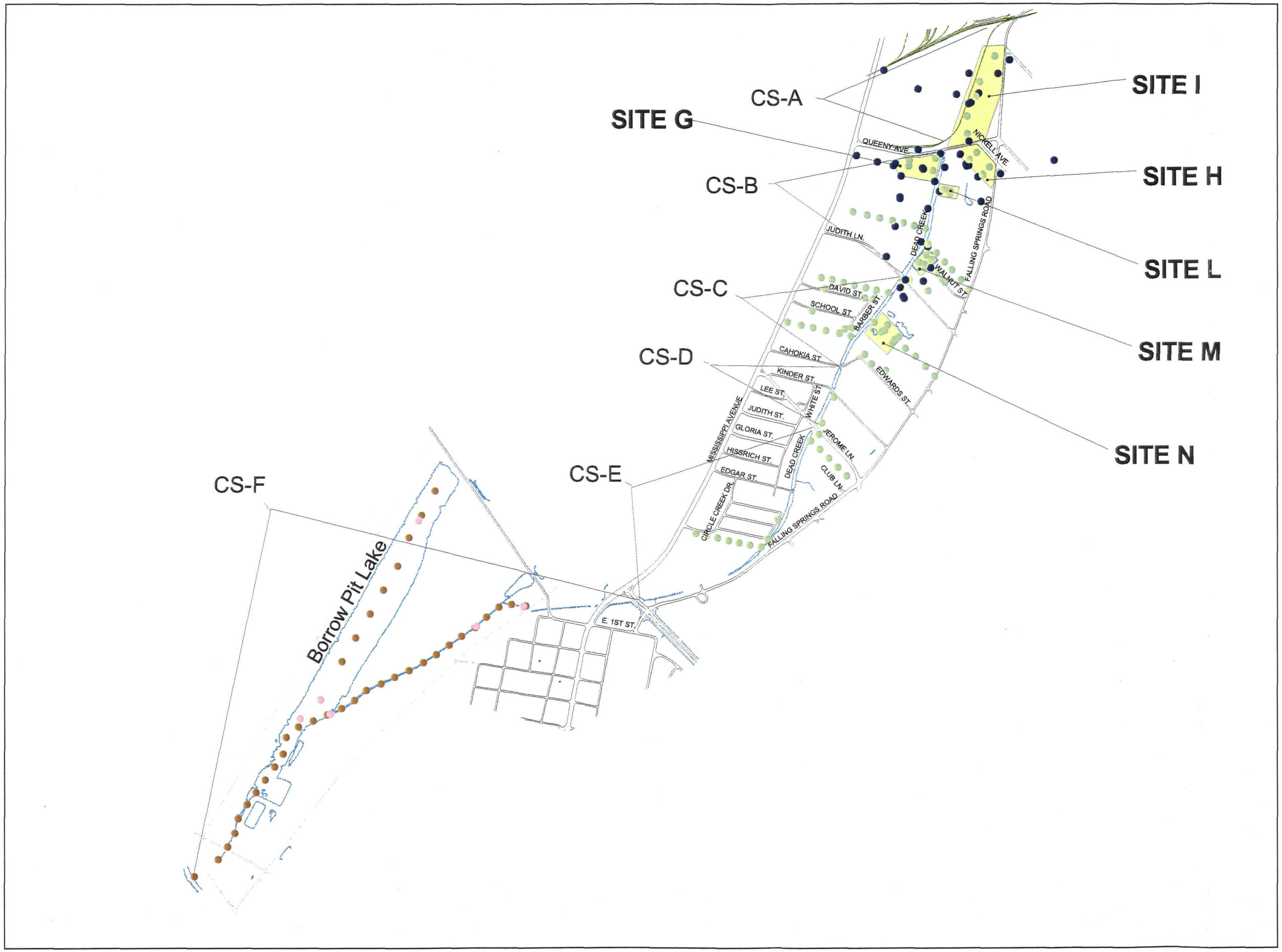
Constituent	Sediment	Fish
Arsenic	X	X
Total PCBs	X	--
Total:	**2**	**1**

Notes:
-- This constituent was not identifed as a constituent of potential concern based on this scenario.

TABLE 3-7
SUMMARY OF CONSTITUENTS OF POTENTIAL CONCERN
SITES - AIR
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Ambient Air Pathway			
	G	H	I	L
4-Methyl-2-pentanone	X	--	--	--
Acetone	X	--	--	--
Methylene Chloride	X	X	X	X
Trichloroethene	--	X	--	--
Total:	**3**	**2**	**1**	**1**

Notes:
-- *This constituent was not identifed as a constituent of potential concern based on this pathway.*



N

LEGEND

Site
Water Body
Roads
Sediment Sample Locations
Soil Sample Locations
Surface Water Sample Locations
Groundwater Well Locations
CS-A Dead Creek Segment Designations

FIGURE 3-1

Soil, Sediment, Surface Water and Groundwater Sampling Locations Evaluated in the Risk Assessment

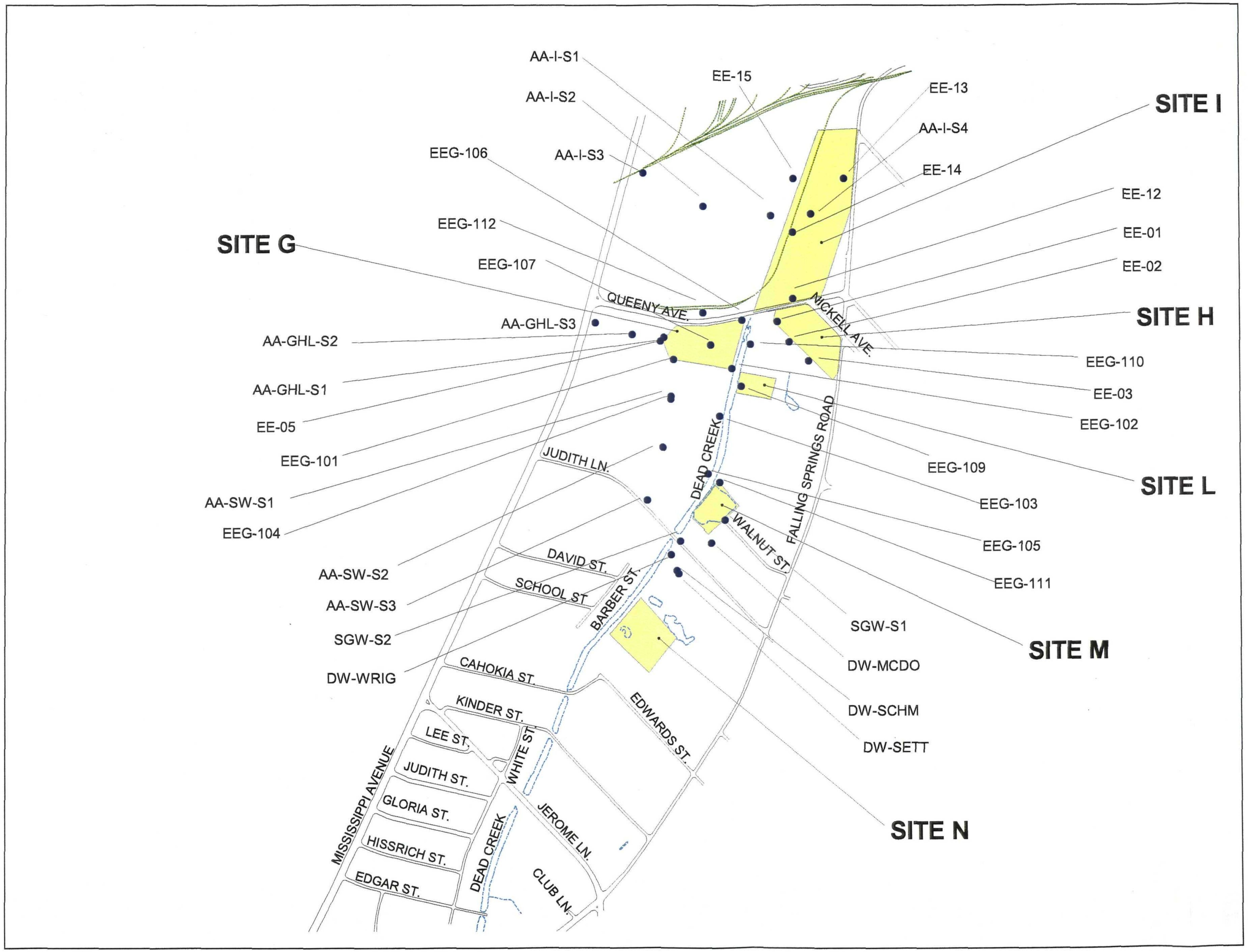
Sauget Area 1
EE/CA and RI/FS
Volume II
Human Health Risk Assessment

Solutia, Inc.
Remediation Technology Group
St. Louis, Missouri

3000 0 3000 Feet

ENSR INTERNATIONAL

J:/Indl_Serv/Project Files/Solutia-6105/Sauget-6105-008/Maps/ensrmaps.apr
December 29, 2000
Revision 0



N

LEGEND

Site
Water Body
Roads
Groundwater Sample Locations

FIGURE 3-2
Groundwater Sample Locations
Evaluated in the HHRA

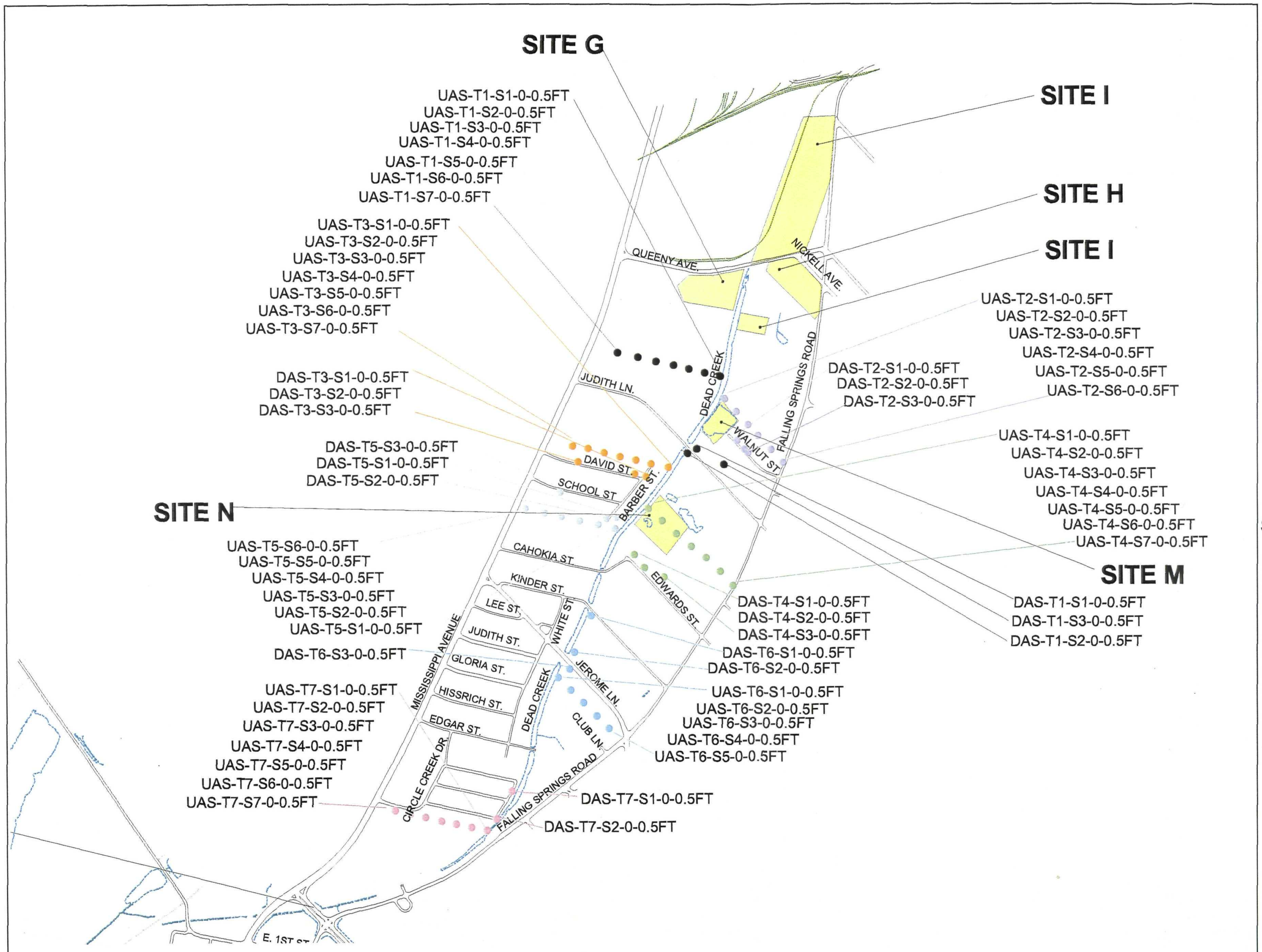
Sauget Area 1
EE/CA and RI/FS
Volume II
Human Health Risk Assessment

Solutia, Inc.
Remediation Technology Group
St. Louis, Missouri

2000 0 2000 Feet

ENSR INTERNATIONAL

J:/Indl_Serv/Project Files/Solutia-6105/Sauget-6105-008/Maps/ensrmaps.apr
December 29, 2000
Revision 0



N

LEGEND

- Site
- Water Body
- Roads
- Transect 1
- Transect 2
- Transect 3
- Transect 4
- Transect 5
- Transect 6
- Transect 7

DAS-T2-S1-0-0.5FT - Surface sample ID and location
Corresponding subsurface soil sample
(-3-6FT) is colocated

FIGURE 3-3

Transect Surface and Subsurface Soil Sample Locations Evaluated in the HHRA

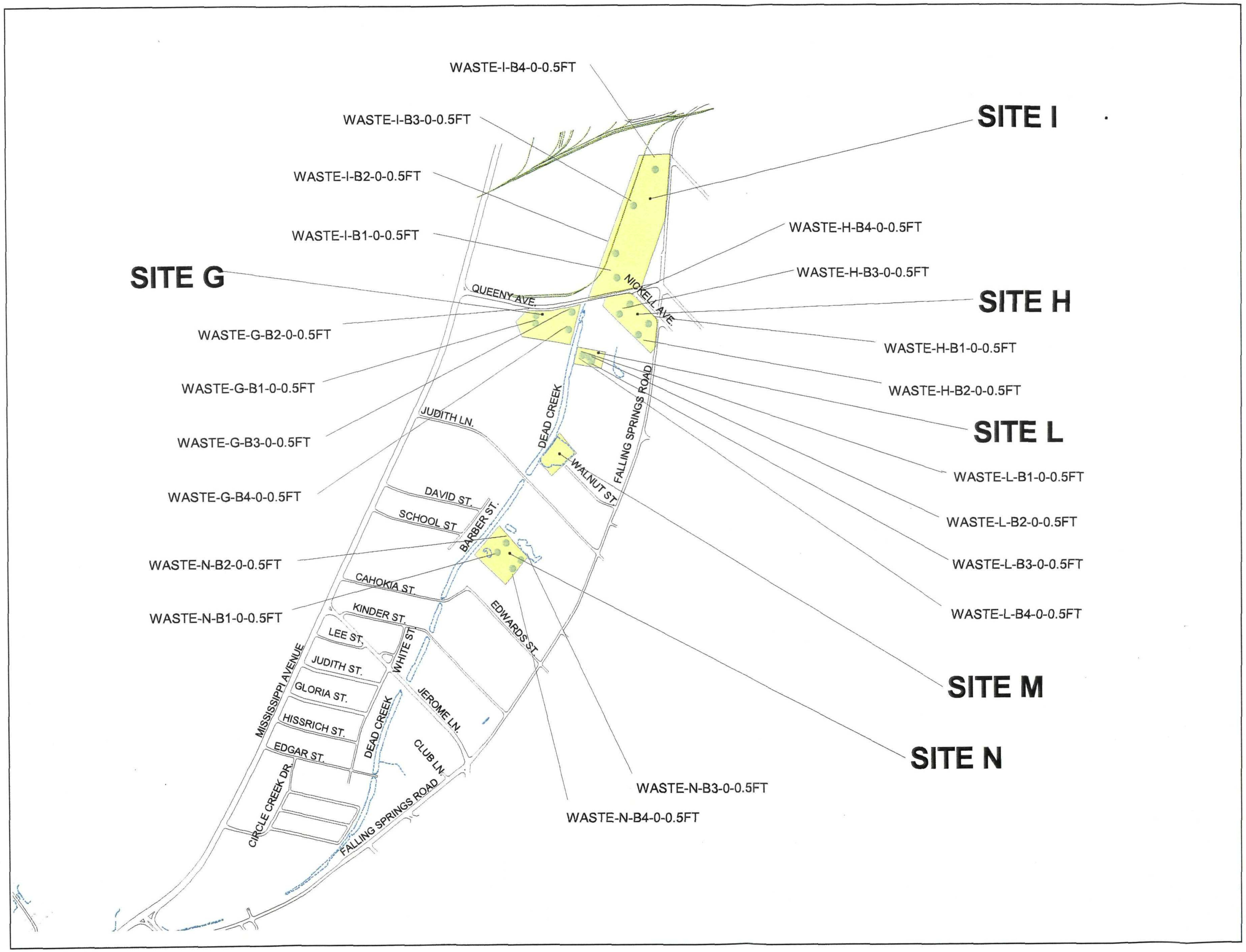
Sauget Area 1
EE/CA and RI/FS
Volume II
Human Health Risk Assessment

Solutia, Inc.
Remediation Technology Group
St. Louis, Missouri

2000 0 2000 Feet

ENSR INTERNATIONAL

J:/Indl_Serv/Project Files/Solutia-6105/Sauget-6105-008/Maps/ensrmaps.apr
December 29, 2000
Revision 0



N

LEGEND

Site
Water Body
Roads
Surface Soil Sample Locations
CS-A Dead Creek Segment Designations

FIGURE 3-4
Site Surface Soil Samples and Locations Evaluated in the HHRA

Sauget Area 1
EE/CA and RI/FS
Volume II
Human Health Risk Assessment

Solutia, Inc.
Remediation Technology Group
St. Louis, Missouri

2000 0 2000 Feet

ENSR INTERNATIONAL

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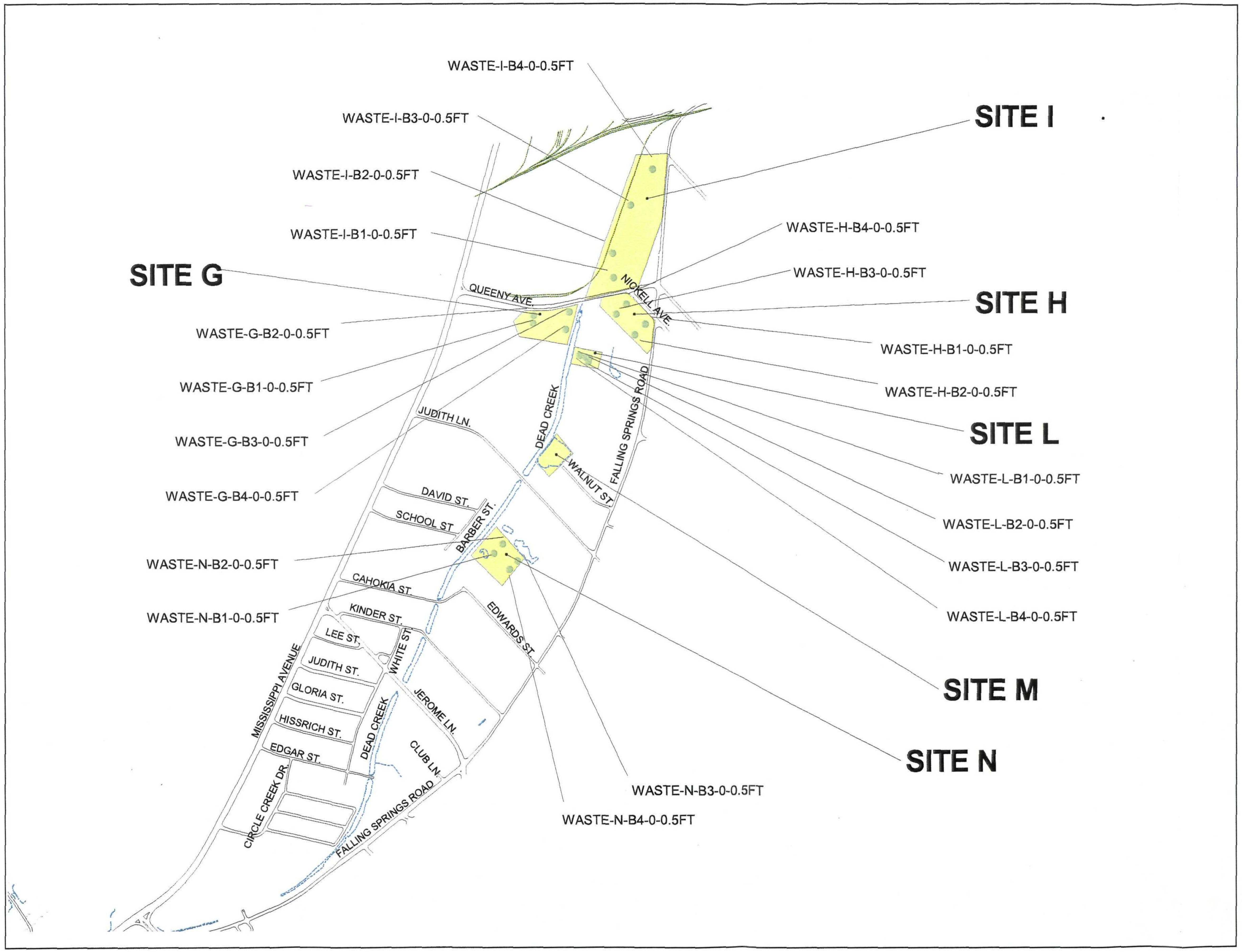
December 29, 2000
Revision 0



N

LEGEND

Site
Water Body
Roads
Surface Soil Sample Locations
CS-A Dead Creek Segment Designations

FIGURE 3-4
Site Surface Soil Samples and Locations Evaluated in the HHRA

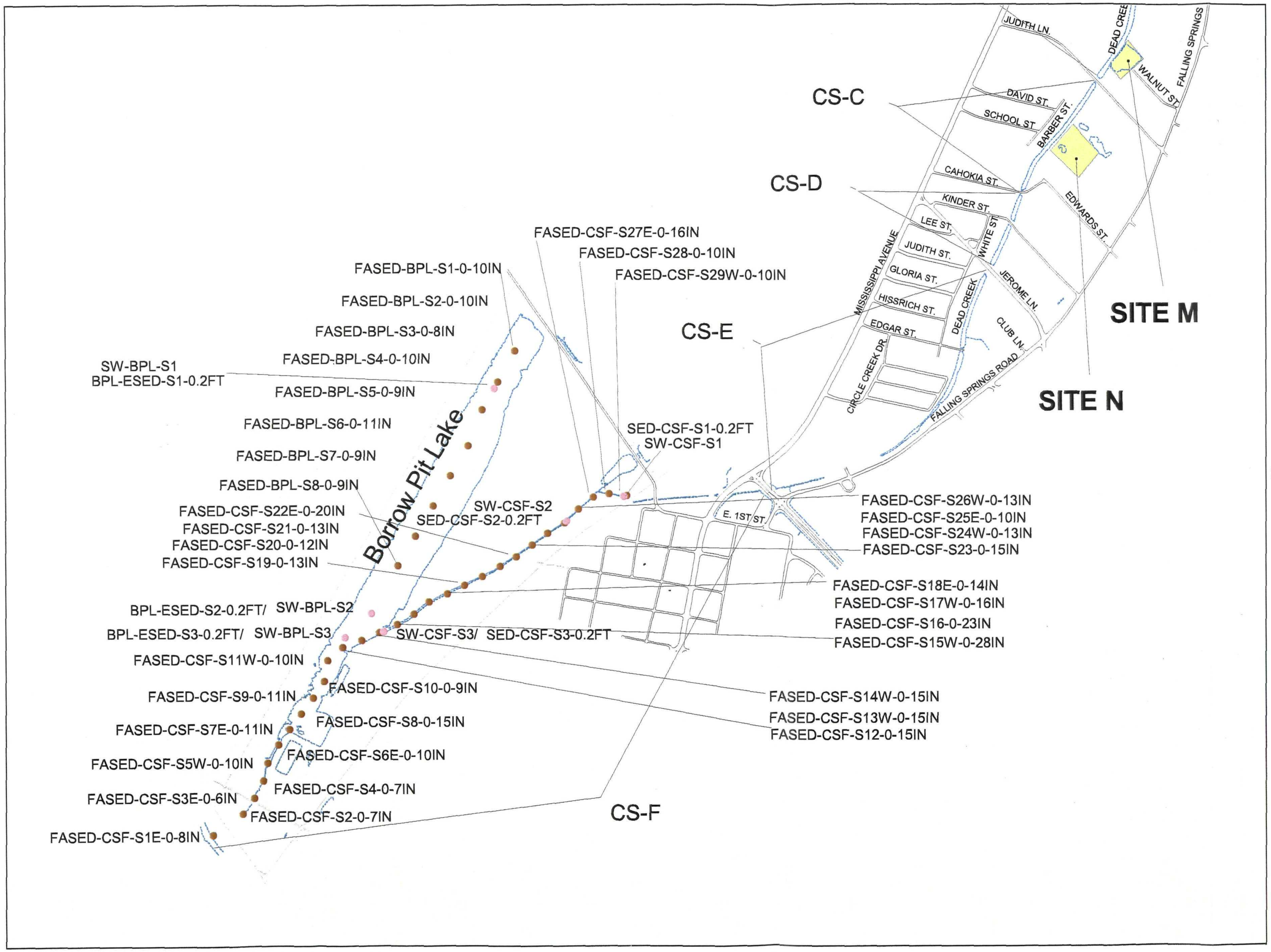
Sauget Area 1
EE/CA and RI/FS
Volume II
Human Health Risk Assessment

Solutia, Inc.
Remediation Technology Group
St. Louis, Missouri

2000 0 2000 Feet

ENSR INTERNATIONAL

J:/Indl_Serv/Project Files/Solutia-6105/Sauget-6105-008/Maps/ensrmaps.apr
December 29, 2000
Revision 0



N

LEGEND

Site
Water Body
Roads
Sediment Sample Locations
Surface Water Sample Locations
CS-A Dead Creek Segment Designations

FIGURE 3-5

Sediment and Surface Water Sample Locations Evaluated in the HHRA

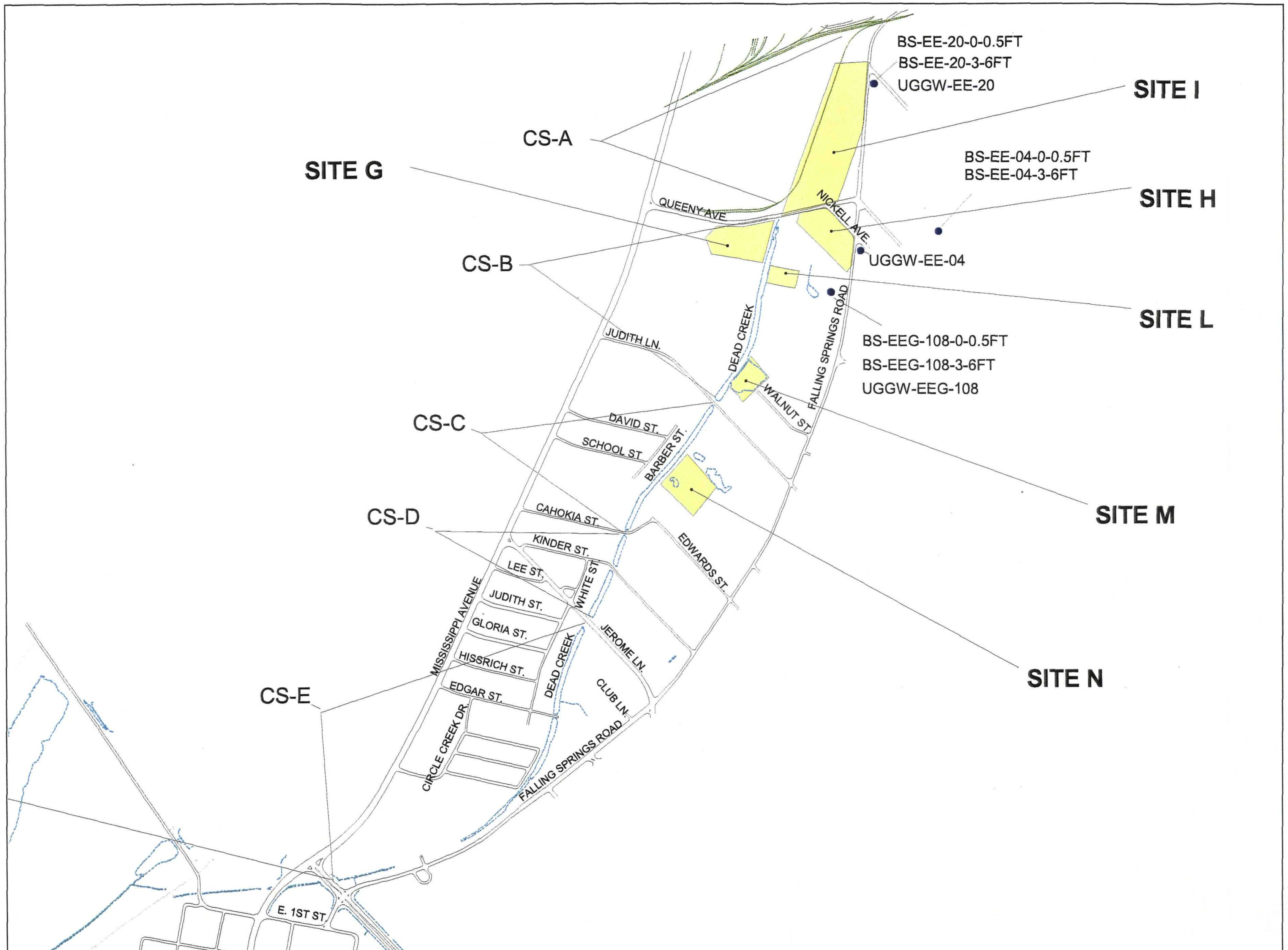
Sauget Area 1
EE/CA and RI/FS
Volume II
Human Health Risk Assessment

Solutia, Inc.
Remediation Technology Group
St. Louis, Missouri

3000 0 3000 Feet

ENSR INTERNATIONAL

J:/Indl_Serv/Project Files/Solutia-6105/Sauget-6105-008/Maps/ensrmaps.apr
December 29, 2000
Revision 0



N

LEGEND

- Site
- Water Body
- Roads
- Background Sample Locations
- CS-A Dead Creek Segment Designations

FIGURE 3-6
Background Sample Locations
Soil and Groundwater

Sauget Area 1
EE/CA and RI/FS
Volume II
Human Health Risk Assessment

Solutia, Inc.
Remediation Technology Group
St. Louis, Missouri

2000 0 2000 Feet

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J:/Indl_Serv/Project Files/Solutia-6105/Sauget-6105-008/Maps/ensrmaps.apr
December 29, 2000
Revision 0

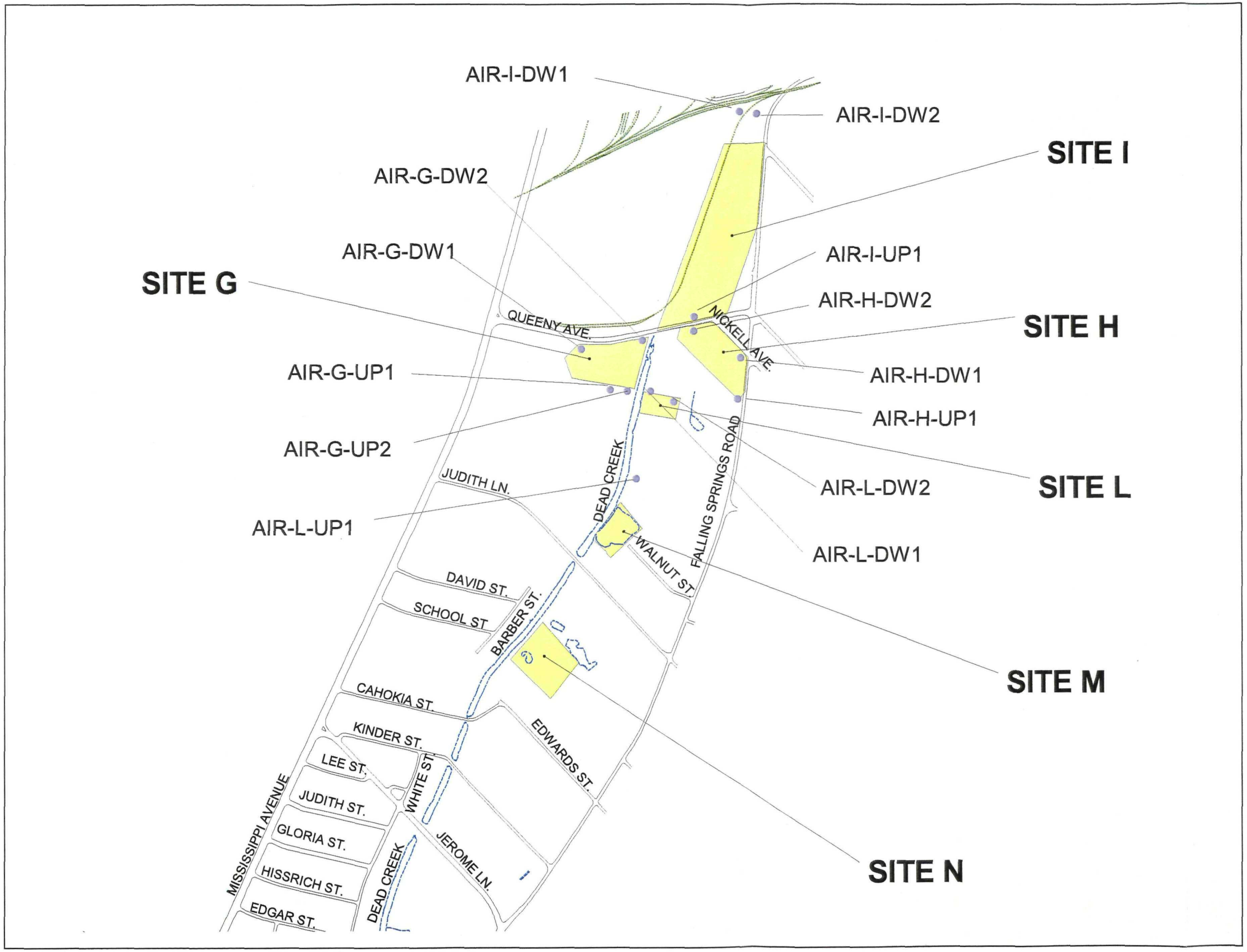

FIGURE 3-7
Air Sample Locations and Results Evaluated in the HHRA

Sauget Area 1
EE/CA and RI/FS
Volume II
Human Health Risk Assessment

Solutia, Inc.
Remediation Technology Group
St. Louis, Missouri

ENSR INTERNATIONAL

J:/Indl_Serv/Project Files/Solutia-6105/Sauget-6105-008/Maps/ensrmaps.apr
December 29, 2000
Revision 0

4.0 DOSE-RESPONSE ASSESSMENT

The purpose of the dose-response assessment is to identify the types of adverse health effects a constituent may potentially cause, and to define the relationship between the dose of a constituent and the likelihood or magnitude of an adverse effect (response) (USEPA, 1989a). Adverse effects are classified by USEPA as potentially carcinogenic or noncarcinogenic (i.e., potential effects other than cancer). Dose-response relationships are defined by USEPA for oral exposure and for exposure by inhalation. Oral toxicity values are also used to assess dermal exposures, with appropriate adjustments, because USEPA has not yet developed values for this route of exposure. Combining the results of the toxicity assessment with information on the magnitude of potential human exposure provides an estimate of potential risk.

Numerical toxicity values are generally obtained from USEPA databases/sources. The dose-response relationship is often determined from laboratory studies conducted under controlled conditions with laboratory animals. These laboratory studies are controlled to minimize responses due to confounding variables, and are conducted at relatively high dose levels to ensure that responses can be observed using as few animals as possible in the experiments. Mathematical models or uncertainty factors are used to extrapolate the relatively high doses administered to animals to predict potential human responses at dose levels far below those tested in animals. [Humans are typically exposed to chemicals in the environment at levels much lower than those tested in animals. These low doses may be detoxified or rendered inactive by the myriad of protective mechanisms that are present in humans (Ames et al., 1987) and that may not function at the high dose levels used in animal experiments. Therefore, the results of these animal studies may only be of limited use in accurately predicting a dose-response relationship in humans.] However, to be protective of human health, USEPA incorporates many conservative assumptions and safety factors when deriving numerical toxicity criteria from laboratory studies, as discussed below.

What is the point here?

This section contains five subsections. Section 4.1 describes the sources of toxicity values. Section 4.2 describes USEPA's approach for developing noncarcinogenic toxicity values. Section 4.3 describes the toxicity values developed by USEPA for the evaluation of potential carcinogenic effects. Section 4.4 discusses PCB dose-response issues, and Section 4.5 discusses dioxin dose-response issues.

4.1 Sources of Toxicity Values

Sources of the published toxicity values in this risk assessment include USEPA's Integrated Risk Information System (IRIS) (USEPA, 2000c), the Health Effects Assessment Summary Tables (HEAST) (USEPA, 1997b), and the USEPA National Center for Environmental Assessment (NCEA) in Cincinnati, Ohio.

The primary USEPA source of toxicity values is IRIS, an on-line computer database of toxicological information (USEPA, 2000c). The IRIS database is updated monthly to provide the most current USEPA verified toxicity values. As defined by the USEPA (1997b), a toxicity value is "Work Group-Verified" if all available information on the value has been examined by an Agency Work Group, the value has been calculated using current Work Group methodology, a unanimous consensus has been reached on the value by the Work Group, and the value appears on IRIS.

Another source of toxicity values is the USEPA Health Effects Assessment Summary Tables (HEAST) (USEPA, 1997b). HEAST is published annually by the USEPA and provides a compilation of toxicity values available at the time of publishing. Because HEAST is no longer updated regularly, the toxicity values provided may not represent the most current values available. In addition, the toxicity values provided by HEAST are considered to be provisional, i.e., the value has had some form of agency review, but does not appear on IRIS. The HEAST values may or may not have been generated through the Agency Work Group process, but the values generally use all available information, use current methodology, and a consensus was reached by Agency scientists on the value. HEAST is, therefore, considered to be an unverified source of dose-response values and should be used only if no toxicity value is available on IRIS.

When a toxicity value is not available from IRIS or HEAST, the USEPA National Center for Environmental Assessment (NCEA) in Cincinnati may be consulted for provisional toxicity values. These toxicity values may or may not meet the HEAST criteria. The NCEA generally provides a toxicological summary for the value. The USEPA Region 3 RBC Table (USEPA, 2000b) and the USEPA Region 9 PRG Table (USEPA, 2000d) also use toxicity information from NCEA where available, and can serve as a source of these values. Therefore, the hierarchy of toxicity value sources correlates in general with the level of confidence in the values, with the values directly provided by NCEA having the lowest level of scientific review and approval and, thus, the least level of confidence.

4.2 Noncarcinogenic Toxicity Assessment

Constituents with known or potential noncarcinogenic effects are assumed to have a dose below which no adverse effect occurs or, conversely, above which an adverse effect may be seen. This dose is called the threshold dose. A conservative estimate of the true threshold dose is called a No Observed Adverse Effect Level (NOAEL). The lowest dose at which an adverse effect has been observed is called a Lowest Observed Adverse Effect Level (LOAEL). By applying uncertainty factors to the NOAEL or the LOAEL, Reference Doses (RfDs) for chronic exposure to chemicals with noncarcinogenic effects have been developed by USEPA (1997b, 2000c).

In regulatory toxicity assessment, USEPA assumes that humans are as sensitive, or more sensitive, to the toxic effects of a chemical as the most sensitive species use in the laboratory studies. Moreover, the RfD is developed based on the most sensitive or critical adverse health effect observed in the study population, with the assumption that if the most critical effect is prevented, then all other potential toxic effects are prevented. Uncertainty factors are applied to the NOAEL (or LOAEL, when a NOAEL is unavailable) for this critical effect to account for uncertainties associated with the dose-response relationship. These include using an animal study to derive a human toxicity value, extrapolating from a LOAEL to a NOAEL, extrapolating from a subchronic (partial lifetime) to a chronic lifetime exposure, and evaluating sensitive subpopulations. Generally, a 10-fold factor is used to account for each of these uncertainties; thus, the total uncertainty factor can range from 10 to 10,000. In addition, an uncertainty factor or a modifying factor of up to 10 can be used to account for inadequacies in the database or other uncertainties. The resulting RfDs are very conservative, i.e., health protective, because of the use of the large uncertainty factors. For chemicals with noncarcinogenic effects, an RfD provides reasonable certainty that no noncarcinogenic health effects are expected to occur even if daily exposures were to occur at the RfD level for a lifetime. RfDs and exposure doses are expressed in units of milligrams of chemical per kilogram of body weight per day (mg/kg-day). The lower the RfD value, the lower is the assumed threshold for effects, and the greater the assumed toxicity.

Table 4-1 summarizes the toxicity information for COPCs with potential noncarcinogenic effects for the oral route of exposure. For each COPC, the chemical abstracts service number (CAS number), the dose-response value (RfD), and the reference for the toxicity value are presented. In addition, the USEPA confidence level in the value, the uncertainty factor, the modifying factor, the study animal, study method, target organ and critical effect upon which the toxicity value is based are also presented for each COPC, where available. The confidence level is provided for constituents published on IRIS, and is based on the confidence in the study and the extent of toxicity information available for that constituent.

Table 4-2 summarizes the toxicity information for COPCs with potential noncarcinogenic effects for the inhalation route of exposure. For each COPC, the CAS number and the toxicity value are presented. Inhalation RfD (in units of mg/kg-day) values are calculated from Reference Concentrations (RfC) (in units of mg/m^3) assuming a 70 kg adult breathes 20 m^3 of air per day. Both values are presented where available. In addition, the reference for the toxicity value, the USEPA confidence level in the value, the uncertainty factor, the modifying factor, the study animal, study method, target organ and critical effect upon which the toxicity value is based are also presented for each constituent. USEPA does not support use of oral toxicity values to evaluate inhalation exposures (USEPA, 1996b).

4.3 Carcinogenic Toxicity Assessment

In assessing the carcinogenic potential of a constituent, the Human Health Assessment Group of USEPA has classified constituents into one of the following groups (USEPA 1997b, 2000c), according to the weight of evidence from epidemiologic and animal studies:

Group A	-	Human Carcinogen (sufficient evidence of carcinogenicity in humans)
Group B	-	Probable Human Carcinogen (B1 - limited evidence of carcinogenicity in humans; B2 - sufficient evidence of carcinogenicity in animals with inadequate or lack of evidence in humans)
Group C	-	Possible Human Carcinogen (limited evidence of carcinogenicity in animals and inadequate or lack of human data)
Group D	-	Not Classifiable as to Human Carcinogenicity (inadequate or no evidence)
Group E	-	Evidence of Noncarcinogenicity for Humans (no evidence of carcinogenicity in adequate studies)

The underlying assumption of regulatory risk characterization for constituents with known or assumed potential carcinogenic effects is that no threshold dose exists. Thus, the characterization assumes that there is some finite level of risk associated with each non-zero dose. The USEPA has developed computerized models that extrapolate dose-response relations observed at the relatively high doses used in animal studies to the low dose levels encountered by humans in environmental situations. The mathematical models developed by USEPA assume no threshold, and use both animal and human data (where available) to develop a potency estimate for a given chemical. The potency estimate, called a cancer slope factor (CSF) is expressed in units of $(mg/kg\text{-}day)^{-1}$; the higher the CSF, the greater the carcinogenic potential.

Table 4-3 summarizes the toxicity information for COPCs classified by the USEPA as potential carcinogens for the oral route of exposure. For each constituent, the CAS number, USEPA carcinogenicity class, the oral cancer-slope factor and the reference are provided. In addition, the study animal and route of exposure upon which the CSF is based are presented.

Table 4-4 summarizes the toxicity information for COPCs classified by the USEPA as potential carcinogens for the inhalation route of exposure. For each constituent, the CAS number, USEPA carcinogenicity class, the inhalation cancer slope factor and unit risk factor (provided in units of $(ug/m^3)^{-1}$)and the reference are provided. In addition, the study animal and route of exposure upon which the CSF is based are presented. The CSF is calculated from the unit risk assuming a 70 kg adult breathes 20 m^3 of air per day.

4.4 PCB Dose-Response

The biphenyl structure of PCBs consists of two aromatic 6-member rings connected by a single bond. There are five locations on each ring that can be chlorinated, and there are 209 individual PCB congeners, each identified by a unique congener number. Structurally, PCB congeners can be classified into groups based on the number of chlorines per molecule (e.g., monochloro-, dichloro-, trichloro-, up to decachloro-biphenyl). These groups are referred to as homologs.

Aroclor mixtures are the commercial mixtures of PCBs that were used in industry. The Aroclors are identified numerically (e.g., Aroclor 1260, Aroclor 1016). The higher the Aroclor number, the more enriched is the mixture in congeners containing higher numbers of chlorines. Each Aroclor mixture exhibits a characteristic, however overlapping, range of congeners, and Aroclors are identified and quantitated in samples by comparing the sample results to Aroclor standards. Total PCBs in a sample can be calculated by summing the Aroclor concentrations. Alternatively, PCBs can be quantitated by homolog and the homolog concentrations summed to give a total PCB concentration. This latter method was used in the Sauget Area 1 risk assessment.

Risks from potential exposures to PCBs have been calculated using the most current guidance available from USEPA. Currently, USEPA-approved guidance is provided in IRIS (USEPA, 2000c). Total PCB concentrations were calculated by summing the separate homolog concentrations. The total PCB concentrations were used to calculate the PCB exposure dose to be combined with the verified cancer slope factors listed in IRIS (USEPA, 2000c). Guidance provided in IRIS specifies three tiers of human slope factors for environmental PCBs: high risk and persistence, low risk and persistence, and lowest risk and persistence. The choice of slope factors for use depends on the medium of exposure and PCB chlorine content, as outlined in IRIS (USEPA, 2000c). These values are presented in Table 4-5. Based on a review of the media evaluated in the risk assessment and the CSF selection criteria, the CSF value of 2 $(mg/kg\text{-}day)^{-1}$ was used in the Sauget Area 1 risk assessment.

Non-cancer risks from potential exposures to PCBs were calculated using the most conservative RfD for a PCB mixture, the oral reference dose for Aroclor 1254 of 2E-05 mg/kg-day.

4.5 Dioxin Dose-Response

The potential carcinogenic effects associated with exposure to dioxin and furan congeners in environmental media were assessed in accordance with the approach developed by USEPA (1989b). Risks were calculated for 2,3,7,8-TCDD and the dioxin and furan congeners using the cancer slope factor for 2,3,7,8-TCDD listed in HEAST and using the toxic equivalency factors (TEFs) provided by World Health Organization (WHO) (Van den Berg et al., 1998). The TEFs are fractions that equate the potential toxicity of each congener to that of 2,3,7,8-TCDD. The TEFs are listed in Table 4-6. For each sample, the reported sample concentration (or half the detection limit, as appropriate, for non-detected congeners) for each dioxin and furan congener having a TEF listed by WHO was multiplied by its TEF, resulting in a TCDD toxic equivalence concentration (TCDD-TEQ). The TCDD-TEQ values for each of the congeners were then added together for each sample and treated as one sample concentration in the risk assessment. The cancer slope factor for 2,3,7,8-TCDD was used to calculate potential carcinogenic risks resulting from potential exposure to 2,3,7,8-TCDD-TEQs.

TABLE 4-1
DOSE-RESPONSE INFORMATION FOR COMPOUNDS WITH POTENTIAL NONCARCINOGENIC EFFECTS FROM CHRONIC EXPOSURE THROUGH THE ORAL ROUTE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	CAS Number	Oral Dose-Response Value (mg/kg-day)	Reference (Last Verified) Type	EPA Confidence Level	Uncertainty Factor	Modifing Factor	Targent Organ/ Critical Effect at LOAEL	Study Animal	Study Method
1,1,2,2-Tetrachloroethane	79-34-5	6.00E-02	NCEA (e)	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	106-46-7	3.00E-02	NCEA (e)	NA	NA	NA	NA	NA	NA
2,4,5-TP (Silvex)	93-72-1	8.00E-03	IRIS (11/2000)	MEDIUM	100	1	Histopathological changes in the liver	DOG	ORAL:DIET
2,4,6-Trichlorophenol	88-06-2	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	120-83-2	3.00E-03	IRIS (11/2000)	LOW	100	1	Decreased delayed hypersensitivity response	RAT	ORAL:DRINKING WATER
2-Chlorophenol	95-57-8	5.00E-03	IRIS (11/2000)	LOW	1000	1	Reproductive effects	RAT	ORAL:DRINKING WATER
2-Nitroaniline	88-74-4	NA	NA	NA	NA	NA	NA	NA	NA
3-Methylphenol/4-Methylphenol	(a)	5.00E-02 (b)	IRIS (11/2000)	MEDIUM	1000	1	Decreased body weight, neurotoxicity	RAT	ORAL:GAVAGE
4,4-DDE	72-55-9	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
4-Chloroaniline	106-47-8	4.00E-03	IRIS (11/2000)	LOW	3000	1	Splenic lesions	RAT	ORAL:DIET
4-Methyl-2-pentanone	108-10-1	8.00E-02	HEAST	NA	3000	1	Increased liver and kidney weights, increased urinary protein	RAT	ORAL:GAVAGE
4-Nitroaniline	100-01-6	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	67-64-1	1.00E-01	IRIS (11/2000)	LOW	1000	1	Increased liver and kidney weights and nephrotoxicity	RAT	ORAL:GAVAGE
alpha-BHC	319-84-6	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Antimony	7440-36-0	4.00E-04	IRIS (11/2000)	LOW	1000	1	Decreased longevity, dec. blood glucose and cholesterol changes	RAT	ORAL:DRINKING WATER
Arsenic	7440-38-2	3.00E-04	IRIS (11/2000)	MEDIUM	3	1	Hyperpigmentation and keratosis of the skin and poss. vascular complications	HUMAN	ORAL:DRINKING WATER
Benzene	71-43-2	3.00E-03	NCEA (7/29/96)	MEDIUM-LOW	3000	NA	Hematological and Immunological	RAT	ORAL:GAVAGE
Benzo(a)anthracene	56-55-3	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	50-32-8	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	205-99-2	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	207-08-9	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
beta-BHC	319-85-7	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Cadmium	7440-43-9	5.00E-04	IRIS (11/2000)	HIGH	10	1	Proteinuria	HUMAN	ORAL
Carbazole	86-74-8	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	108-90-7	2.00E-02	IRIS (11/2000)	MEDIUM	1000	1	Histopathologic changes in liver	DOG	ORAL:CAPSULE
Chloroform	67-66-3	1.00E-02	IRIS (11/2000)	MEDIUM	1000	1	Fatty cyst formation in liver	DOG	ORAL:CAPSULE
Cis/Trans-1,2-Dichloroethene	107-06-2	1.00E-02 (c)	HEAST	NA	3000	1	Decreased hematocrit and hemoglobin	RAT	ORAL:GAVAGE
Copper	7440-50-8	3.70E-02	HEAST	NA	NA	NA	GI irritation	HUMAN	ORAL
delta-BHC	319-86-8	3.00E-04 (f)	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	53-70-3	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Dieldrin	60-57-1	5.00E-05	IRIS (11/2000)	MEDIUM	100	1	Liver lesions	RAT	ORAL:DIET
Ethylbenzene	100-41-4	1.00E-01	IRIS (11/2000)	LOW	1000	1	Liver and kidney toxicity	RAT	ORAL:GAVAGE

TABLE 4-1
DOSE-RESPONSE INFORMATION FOR COMPOUNDS WITH POTENTIAL NONCARCINOGENIC EFFECTS FROM CHRONIC EXPOSURE THROUGH THE ORAL ROUTE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	CAS Number	Oral Dose-Response Value (mg/kg-day)		Reference (Last Verified) Type	EPA Confidence Level	Uncertainty Factor	Modifing Factor	Targent Organ/ Critical Effect at LOAEL	Study Animal	Study Method
gamma-BHC	58-89-9	3.00E-04		IRIS (11/2000)	MEDIUM	1000	1	Liver and kidney toxicity	RAT	ORAL:DIET
Heptachlor	76-44-8	5.00E-04		IRIS (11/2000)	LOW	300	1	Increased liver weight	RAT	ORAL:DIET
Heptachlor epoxide	1024-57-3	1.30E-05		IRIS (11/2000)	LOW	1000	1	Increased liver to body-weight ratios	DOG	ORAL:DIET
Indeno(1,2,3-cd)pyrene	193-39-5	NA		IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Lead	7439-92-1	NA		IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Molybdenum	7439-98-7	5.00E-03		IRIS (11/2000)	MEDIUM	30	1	Increased uric acid levels	HUMAN	ORAL:DIET
Naphthalene	91-20-3	2.00E-02		IRIS (11/2000)	LOW	3000	1	Decreased BW in males	RAT	ORAL:GAVAGE
Nickel	7440-02-0	2.00E-02		IRIS (11/2000)	MEDIUM	300	1	Decreased body & organ wts	RAT	ORAL:DIET
Nitrobenzene	98-95-3	5.00E-04		IRIS (11/2000)	LOW	10000	1	Hematologic effects, and adrenal, renal & hepatic lesions	RAT/MOUSE	INHALATION
Pentachlorophenol	87-86-5	3.00E-02		IRIS (11/2000)	MEDIUM	100	1	Liver & kidney pathology	RAT	ORAL:DIET
Phenol	108-95-2	6.00E-01		IRIS (11/2000)	Low	100	1	Reduced fetal body weights	RAT	ORAL:GAVAGE
Tetrachloroethene	127-18-4	1.00E-02		IRIS (11/2000)	MEDIUM	1000	1	Hepatotoxicity in mice, decreased weight gain in rats	MOUSE/RAT	ORAL:GAVAGE/DRINKING WATER
Toluene	108-88-3	2.00E-01		IRIS (11/2000)	MEDIUM	1000	1	Changes in liver and kidney weights	RAT	ORAL:GAVAGE
Total 2,3,7,8-TCDD TEQ	1746-01-6	NA		HEAST	NA	NA	NA	NA	NA	NA
Total PCBs	1336-36-3	2.00E-05	(d)	IRIS (11/2000)	MEDIUM	300	1	Ocular, meibomiam gland, finger and toenail, and immune effects	MONKEY	ORAL:CAPSULE
Trichloroethene	79-01-6	6.00E-03		NCEA (e)	LOW	3000	1	Increased relative liver weight	MOUSE	ORAL:DRINKING WATER
Vanadium	7440-62-2	7.00E-03		HEAST	NA	100	1	No effects reported	RAT	ORAL:DRINKING WATER
Vinyl chloride	75-01-4	3.00E-03		IRIS (11/2000)	MEDIUM	30	1	Liver cell polymorphism	RAT	ORAL:DIET
Zinc	7440-66-6	3.00E-01		IRIS (11/2000)	MEDIUM	3	1	Hematologic effects	HUMAN	ORAL:DIET SUPPLEMENT

Notes:
CAS - Chemical Abstracts Service.
LOAEL - Lowest Observed Adverse Effects Level.
RfD - Reference Dose.
NCEA - National Center for Environmental Assessment.
IRIS - Integrated Risk Information System, an on-line computer database of toxicological information (USEPA, 2000c).
HEAST - Health Effects Assessment Summary Tables, published annually by the USEPA (1997b).
(a) The CAS numbers for 3-Methylphenol and 4-Methylphenol are 108-44-5 and 108-39-4, respectively.
(b) Value for 3-Methylphenol, IRIS value for 4-Methylphenol has been withdrawn.
(c) Value for cis-1,2-dichloroethene
(d) Value for Aroclor 1254 (IRIS)
(e) As reported in the USEPA Region 9 PRG Table (10/1999)

TABLE 4-2
DOSE-RESPONSE INFORMATION FOR COMPOUNDS WITH POTENTIAL NONCARCINOGENIC EFFECTS THROUGH THE INHALATION ROUTE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	CAS Number	Inhalation Dose-Response Value (mg/kg-day)	Inhalation Reference Concentration (mg/m³)	Reference (Last Verified) Type	EPA Confidence Level	Uncertainty Factor	Modifying Factor	Target Organ/ Critical Effect at LOAEL	Study Animal	Study Method
1,1,2,2-Tetrachloroethane	79-34-5	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	106-46-7	2.29E-01	8.05E-01	IRIS (11/2000)	MEDIUM	100	1	Increased liver weight	RAT	INHALATION
2,4,5-TP (Silvex)	93-72-1	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	88-06-2	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	120-83-2	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
2-Chlorophenol	95-57-8	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
2-Nitroaniline	88-74-4	5.71E-05	2.00E-04	HEAST	NA	10000	1	Hematological effects	RAT	INHALATION,INTERMITTENT
3-Methylphenol/4-Methylphenol	(a)	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
4,4-DDE	72-55-9	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
4-Chloroaniline	106-47-8	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	108-10-1	2.29E-02	8.00E-02	HEAST	NA	1000	1	Increased liver wt, kidney effects	RAT	INHALATION INTERMITTENT
4-Nitroaniline	100-01-6	5.71E-05 (b)	NA	NA	NA	10000	1	Hematological effects	RAT	INHALATION:INTERMITTENT
Acetone	67-64-1	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
alpha-BHC	319-84-6	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Antimony	7440-36-0	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Arsenic	7440-38-2	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Benzene	71-43-2	1.70E-03	6.00E-03	NCEA (7/2/96)	MEDIUM	1000	NA	Hematopoietic Effects	MOUSE	INHALATION:VAPOR
Benzo(a)anthracene	56-55-3	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	50-32-8	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	205-99-2	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	207-08-9	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
beta-BHC	319-85-7	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Cadmium	7440-43-9	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Carbazole	86-74-8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	108-90-7	5.71E-03	2.00E-02	HEAST	NA	10000	1	Liver and kidney effects	RAT	INHALATION: INTERMITTENT
Chloroform	67-66-3	8.60E-05	NA	NCEA 12/1/97	NA	NA	NA	Nasal Effects	NA	NA
Cis/Trans-1,2-Dichloroethene	107-06-2	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Copper	7440-50-8	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
delta-BHC	319-86-8	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	53-70-3	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Dieldrin	60-57-1	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Ethylbenzene	100-41-4	2.86E-01	1.00E+00	IRIS (11/2000)	LOW	300	1	Developmental toxicity	RAT/RABBIT	INHALATION

TABLE 4-2
DOSE-RESPONSE INFORMATION FOR COMPOUNDS WITH POTENTIAL NONCARCINOGENIC EFFECTS THROUGH THE INHALATION ROUTE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	CAS Number	Inhalation Dose-Response Value (mg/kg-day)	Inhalation Reference Concentration (mg/m³)	Reference (Last Verified) Type	EPA Confidence Level	Uncertainty Factor	Modifying Factor	Target Organ/ Critical Effect at LOAEL	Study Animal	Study Method
gamma-BHC	58-89-9	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Heptachlor	76-44-8	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	1024-57-3	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	193-39-5	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Lead	7439-92-1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Molybdenum	7439-98-7	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Naphthalene	91-20-3	8.57E-04	3.00E-03	IRIS (11/2000)	MEDIUM	3000	1	Nasal effects	MOUSE	INHALATION
Nickel	7440-02-0	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Nitrobenzene	98-95-3	5.70E-04	2.00E-03	HEAST	NA	10000	1	Hematological effects and adrenal, renal, and heptatic lesions	MOUSE/RAT	INHALATION
Pentachlorophenol	87-86-5	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Phenol	108-95-2	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Tetrachloroethene	127-18-4	1.14E-01	4.00E-01	NCEA (c)	MEDIUM	300	1	Hepatotoxicity and renal toxicity	MOUSE	INHALATION
Toluene	108-88-3	1.14E-01	4.00E-01	IRIS (11/2000)	MEDIUM	300	1	Neurological effects	HUMAN	INHALATION:OCCUPATIONAL
Total 2,3,7,8-TCDD TEQ	1746-01-6	NA	NA	HEAST	NA	NA	NA	NA	NA	NA
Total PCBs	1336-36-3	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Trichloroethene	79-01-6	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA
Vanadium	7440-62-2	NA	NA	HEAST	NA	NA	NA	NA	NA	NA
Vinyl chloride	75-01-4	2.86E-02	1.00E-01	IRIS (11/2000)	MEDIUM	30	1	Liver cell polymorphism	RAT	ORAL DIET
Zinc	7440-66-6	NA	NA	IRIS (11/2000)	NA	NA	NA	NA	NA	NA

Notes.
CAS - Chemical Abstracts Service.
LOAEL - Lowest Observed Adverse Effects Level
RfC - Reference Concentration.
NCEA - National Center for Environmental Assessment
IRIS - Integrated Risk Information System, an on-line computer database of toxicological information (USEPA, 2000c)
HEAST - Health Effects Assessment Summary Tables, published annually by the USEPA (1997b).
(a) The CAS numbers for 3-Methylphenol and 4-Methylphenol are 106-44-5 and 108-39-4, respectively.
(b) Due to structural similarities, value for 2-Nitroaniline used.
(c) As reported in the USEPA Region 9 PRG Table (10/1999)

TABLE 4-3
DOSE-RESPONSE INFORMATION FOR COMPOUNDS WITH POTENTIAL CARCINOGENIC EFFECTS BY THE ORAL ROUTE OF EXPOSURE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	CAS Number	EPA Carcinogen Class	Oral CSF (mg/kg-day)$^{-1}$		Oral CSF Reference (Last Verified)	Oral CSF Study Animal	Oral CSF Study Method
1,1,2,2-Tetrachloroethane	79-34-5	C	2 00E-01		IRIS (11/2000)	MOUSE	ORAL GAVAGE
1,4-Dichlorobenzene	106-46-7	C	2 40E-02		HEAST (1997)	MOUSE	ORAL GAVAGE
2,4,5-TP (Silvex)	93-72-1	D	NA		IRIS (11/2000)	NA	NA
2,4,6-Trichlorophenol	88-06-2	B2	1 10E-02		IRIS (11/2000)	RAT	ORAL DIET
2,4-Dichlorophenol	120-83-2	NA	NA		IRIS (11/2000)	NA	NA
2-Chlorophenol	95-57-8	NA	NA		IRIS (11/2000)	NA	NA
2-Nitroaniline	88-74-4	NA	NA		IRIS (11/2000)	NA	NA
3-Methylphenol/4-Methylphenol	(a)	C	NA		IRIS (11/2000)	NA	NA
4,4-DDE	72-55-9	B2	3 40E-01		IRIS (11/2000)	MOUSE/HAMSTER	ORAL DIET
4-Chloroaniline	106-47-8	NA	NA		IRIS (11/2000)	NA	NA
4-Methyl-2-pentanone	108-10-1	NA	NA		IRIS (11/2000)	NA	NA
4-Nitroaniline	100-01-6	NA	NA		NA	NA	NA
Acetone	67-64-1	D	NA		IRIS (11/2000)	NA	NA
alpha-BHC	319-84-6	B2	6.30E+00		IRIS (11/2000)	MOUSE	ORAL DIET
Antimony	7440-36-0	NA	NA		IRIS (11/2000)	NA	NA
Arsenic	7440-38-2	A	1.50E+00		IRIS (11/2000)	HUMAN	ORAL DRINKING WATER
Benzene	71-43-2	A	1.50E-02	(b)	IRIS (11/2000)	HUMAN	INHALATION OCCUPATIONAL
Benzo(a)anthracene	56-55-3	B2	7.30E-01	(c)	IRIS (11/2000)	NA	NA
Benzo(a)pyrene	50-32-8	B2	7.30E+00		IRIS (11/2000)	MOUSE	ORAL DIET
Benzo(b)fluoranthene	205-99-2	B2	7 30E-01	(c)	IRIS (11/2000)	NA	NA
Benzo(k)fluoranthene	207-08-9	B2	7.30E-02	(d)	IRIS (11/2000)	NA	NA
beta-BHC	319-85-7	C	1 80E+00		IRIS (11/2000)	MOUSE	ORAL DIET
Cadmium	7440-43-9	B1	NA		IRIS (11/2000)	NA	NA
Carbazole	86-74-8	B2	2 00E-02		HEAST	MOUSE	ORAL DIET
Chlorobenzene	108-90-7	D	NA		IRIS (11/2000)	NA	NA
Chloroform	67-66-3	B2	6 10E-03		IRIS (11/2000)	RAT	ORAL DRINKING WATER
Cis/Trans-1,2-Dichloroethene	107-06-2	D	NA	(e)	IRIS (11/2000)	NA	NA
Copper	7440-50-8	D	NA		IRIS (11/2000)	NA	NA
delta-BHC	319-86-8	D	NA		IRIS (11/2000)	NA	NA
Dibenzo(a,h)anthracene	53-70-3	B2	7.30E+00	(f)	IRIS (11/2000)	NA	NA
Dieldrin	60-57-1	B2	1 60E+01		IRIS (11/2000)	MOUSE	ORAL DIET
Ethylbenzene	100-41-4	D	NA		IRIS (11/2000)	NA	NA
gamma-BHC	58-89-9	B2-C	1.30E+00		HEAST	MOUSE	ORAL DIET
Heptachlor	76-44-8	B2	4 50E+00		IRIS (11/2000)	MOUSE	ORAL DIET
Heptachlor epoxide	1024-57-3	B2	9 10E+00		IRIS (11/2000)	MOUSE	ORAL DIET
Indeno(1,2,3-cd)pyrene	193-39-5	B2	7.30E-01	(c)	IRIS (11/2000)	NA	NA
Lead	7439-92-1	B2	NA		NA	NA	NA
Molybdenum	7439-98-7	NA	NA		IRIS (11/2000)	NA	NA
Naphthalene	91-20-3	C	NA		IRIS (11/2000)	NA	NA
Nickel	7440-02-0	NA	NA	(i)	IRIS (11/2000)	NA	NA
Nitrobenzene	98-95-3	D	NA		IRIS (11/2000)	NA	NA
Pentachlorophenol	87-86-5	B2	1 20E-01		IRIS (11/2000)	MOUSE	ORAL DIET
Phenol	108-95-2	D	NA		IRIS (11/2000)	NA	NA
Tetrachloroethene	127-18-4	NA	5.20E-02		NCEA (k)	NA	NA
Toluene	108-88-3	D	NA		IRIS (11/2000)	NA	NA
Total 2,3,7,8-TCDD TEQ	1746-01-6	B2	1 50E+05		HEAST	RAT	ORAL DIET
Total PCBs	1336-36-3	B2	2 00E+00	(g)	IRIS (11/2000)	RAT	ORAL DIET
Trichloroethene	79-01-6	NA	1 10E-02		NCEA (k)	MOUSE	ORAL GAVAGE
Vanadium	7440-62-2	NA	NA		HEAST	NA	NA
Vinyl chloride	75-01-4	A	7 20E-01	(h)	IRIS (11/2000)	RAT	ORAL DIET
Zinc	7440-66-6	D	NA		IRIS (11/2000)	NA	NA

Notes
CAS - Chemical Abstracts Service
CSF - Cancer Slope Factor
NCEA - National Center for Environmental Assessment
IRIS - Integrated Risk Information System, an online computer database of toxicological information (USEPA, 2000c)
HEAST - Health Effects Assessment Summary Tables, published annually by the USEPA (1997b)
(a) The CAS numbers for 3-Methylphenol and 4-Methylphenol are 108-44-5 and 106-39-4, respectively
(b) IRIS provides a range of CSF for benzene of 1 5E-02 to 5 5E-02 kg*day/mg IRIS states that each value within this range has equal scientific plausibility
(c) CSF based on that for benzo(a)pyrene and applying a relative potency factor of 0 1 per USEPA Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons (USEPA, 1993d)
(d) CSF based on that for benzo(a)pyrene and applying a relative potency factor of 0.01 per USEPA Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons (USEPA, 1993d)
(e) Cis-1,2-Dichloroethene has a carcinogen class of D; trans-1,2-Dichloroethene has not been classified, per IRIS
(f) CSF based on that for benzo(a)pyrene and applying a relative potency factor of 1 0 per USEPA Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons (USEPA, 1993d)
(g) This is the upperbound CSF for high risk and persistence PCBs USEPA provides a range of slope factor on IRIS, these will be discussed in the risk characterization
(h) Value provided by IRIS for continuous adult exposure This value used in calculations as vinyl chloride was not identified as a constituent of potential concern in residential areas
(i) - Information for nickel, soluble salts on IRIS

TABLE 4-4
DOSE-RESPONSE INFORMATION FOR COMPOUNDS WITH POTENTIAL CARCINOGENIC EFFECTS BY THE INHALATION ROUTE OF EXPOSURE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	CAS Number	EPA Carcinogen Class	Inhalation CSF (mg/kg-day)$^{-1}$ (i)	Unit Risk Factor (m^3/ug)	Inhalation CSF Reference (Last Verified)	Inhalation CSF Study Animal	Inhalation CSF Study Method
1,1,2,2-Tetrachloroethane	79-34-5	C	2.03E-01	5.80E-05	IRIS (11/2000)	MOUSE	ORAL GAVAGE
1,4-Dichlorobenzene	106-46-7	C	2.20E-02	NA	NCEA (k)	NA	NA
2,4,5-TP (Silvex)	93-72-1	D	NA	NA	IRIS (11/2000)	NA	NA
2,4,6-Trichlorophenol	88-06-2	B2	1.09E-02	3.10E-06	IRIS (11/2000)	RAT	ORAL DIET
2,4-Dichlorophenol	120-83-2	NA	NA	NA	IRIS (11/2000)	NA	NA
2-Chlorophenol	95-57-8	NA	NA	NA	IRIS (11/2000)	NA	NA
2-Nitroaniline	88-74-4	NA	NA	NA	IRIS (11/2000)	NA	NA
3-Methylphenol/4-Methylphenol	(a)	C	NA	NA	IRIS (11/2000)	NA	NA
4,4-DDE	72-55-9	B2	NA	NA	IRIS (11/2000)	NA	NA
4-Chloroaniline	106-47-8	NA	NA	NA	IRIS (11/2000)	NA	NA
4-Methyl-2-pentanone	108-10-1	NA	NA	NA	IRIS (11/2000)	NA	NA
4-Nitroaniline	100-01-6	NA	NA	NA	NA	NA	NA
Acetone	67-64-1	D	NA	NA	IRIS (11/2000)	NA	NA
alpha-BHC	319-84-6	B2	6.30E+00	1.80E-03	IRIS (11/2000)	MOUSE	ORAL DIET
Antimony	7440-36-0	NA	NA	NA	NA	NA	NA
Arsenic	7440-38-2	A	1.50E+01	4.30E-03	IRIS (11/2000)	HUMAN	INHALATION OCCUPATIONAL
Benzene	71-43-2	A	7.70E-03 (b)	2.20E-06	IRIS (11/2000)	HUMAN	INHALATION OCCUPATIONAL
Benzo(a)anthracene	56-55-3	B2	3.10E-01 (c)	NA	IRIS (11/2000)	NA	NA
Benzo(a)pyrene	50-32-8	B2	3.10E+00	NA	NCEA (k)	NA	NA
Benzo(b)fluoranthene	205-99-2	B2	3.10E-01 (c)	NA	IRIS (11/2000)	NA	NA
Benzo(k)fluoranthene	207-08-9	B2	3.10E-02 (d)	NA	IRIS (11/2000)	NA	NA
beta-BHC	319-85-7	C	1.86E+00	5.30E-04	IRIS (11/2000)	MOUSE	ORAL DIET
Cadmium	7440-43-9	B1	6.30E+00	1.80E-03	IRIS (11/2000)	HUMAN	INHALATION OCCUPATIONAL
Carbazole	86-74-8	B2	NA	NA	NA	NA	NA
Chlorobenzene	108-90-7	D	NA	NA	IRIS (11/2000)	NA	NA
Chloroform	67-66-3	B2	8.05E-02	2.30E-05	IRIS (11/2000)	MOUSE	ORAL GAVAGE
Cis/Trans-1,2-Dichloroethene	107-06-2	D	NA	NA	IRIS (11/2000)	NA	NA
Copper	7440-50-8	D	NA	NA	IRIS (11/2000)	NA	NA
delta-BHC	319-86-8	D	NA	NA	IRIS (11/2000)	NA	NA
Dibenzo(a,h)anthracene	53-70-3	B2	3.10E+00 (f)	NA	IRIS (11/2000)	NA	NA
Dieldrin	60-57-1	B2	1.61E+01	4.60E-03	IRIS (11/2000)	MOUSE	ORAL DIET
Ethylbenzene	100-41-4	D	NA	NA	IRIS (11/2000)	NA	NA
gamma-BHC	58-89-9	B2-C	NA	NA	IRIS (11/2000)	NA	NA
Heptachlor	76-44-8	B2	4.50E+00	1.30E-03	IRIS (11/2000)	MOUSE	ORAL DIET
Heptachlor epoxide	1024-57-3	B2	9.10E+00	2.60E-03	IRIS (11/2000)	MOUSE	ORAL DIET
Indeno(1,2,3-cd)pyrene	193-39-5	B2	3.10E-01 (c)	NA	IRIS (11/2000)	NA	NA
Lead	7439-92-1	B2	NA	NA	IRIS (11/2000)	NA	NA
Molybdenum	7439-98-7	NA	NA	NA	IRIS (11/2000)	NA	NA
Naphthalene	91-20-3	C	NA	NA	IRIS (11/2000)	NA	NA
Nickel	7440-02-0	NA	NA (j)	NA	IRIS (11/2000)	NA	NA
Nitrobenzene	98-95-3	D	NA	NA	IRIS (11/2000)	NA	NA
Pentachlorophenol	87-86-5	B2	NA	NA	IRIS (11/2000)	NA	NA
Phenol	108-95-2	D	NA	NA	NA	NA	NA
Tetrachloroethene	127-18-4	NA	2.00E-03	5.80E-07	NCEA (k)	NA	NA
Toluene	108-88-3	D	NA	NA	IRIS (11/2000)	NA	NA
Total 2,3,7,8-TCDD TEQ	1746-01-6	B2	1.50E+05	NA	HEAST	RAT	ORAL DIET
Total PCBs	1336-36-3	B2	2.00E+00 (g)	NA	IRIS (11/2000)	RAT	ORAL DIET
Trichloroethene	79-01-6	NA	6.00E-03	NA	NCEA (k)	NA	NA
Vanadium	7440-62-2	NA	NA	NA	HEAST	NA	NA
Vinyl chloride	75-01-4	A	1.54E-02	4.40E-06 (h)	IRIS (11/2000)	RAT	INHALATION
Zinc	7440-66-6	D	NA	NA	IRIS (11/2000)	NA	NA

Notes:
CAS - Chemical Abstracts Service
CSF - Cancer Slope Factor
NCEA - National Center for Environmental Assessment
IRIS - Integrated Risk Information System, an online computer database of toxicological information (USEPA, 2000c).
HEAST - Health Effects Assessment Summary Tables, published annually by the USEPA (1997b)
(a) The CAS numbers for 3-Methylphenol and 4-Methylphenol are 108-44-5 and 106-39-4, respectively
(b) IRIS provides a range of inhalation unit risk factors for benzene of 2.2E-06 to 7.8E-06 m^3/ug. These are equivalent to an CSF range of 7.7 E-03 to 2.7E-02 kg*day/mg. IRIS states that each value within this range has equal scientific plausibility.
(c) CSF based on that for benzo(a)pyrene and applying a relative potency factor of 0.1 per USEPA Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons (USEPA, 1993d)
(d) CSF based on that for benzo(a)pyrene and applying a relative potency factor of 0.01 per USEPA Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons (USEPA, 1993d)
(e) Cis-1,2-Dichloroethene has a carcinogen class of D; trans-1,2-Dichloroethene has not been classified; per IRIS
(f) CSF based on that for benzo(a)pyrene and applying a relative potency factor of 1.0 per USEPA Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons (USEPA, 1993d)
(g) This is the upperbound CSF for high risk and persistence PCBs. USEPA provides a range of slope factor or IRIS; these will be discussed in the risk characterization
(h) Value provided by IRIS for continuous adult exposure. This value used in calculations as vinyl chloride was not identified as a constituent of potential concern in residential areas
(i) Inhalation CSF calculated from the unit risk factor, where available, assuming a 70 kg adult breathes 20 m^3 of air per day
(j) - Information for nickel, soluble salts, on IRIS
(k) As reported in the USEPA Region 9 PRG Table (10/1999)

TABLE 4-5 **TIERS OF CANCER SLOPE FACTORS FOR ENVIRONMENTAL PCBs (a)** **SAUGET AREA 1 - EE/CA AND RI/FS** **HUMAN HEALTH RISK ASSESSMENT**
HIGH RISK AND PERSISTENCE Upper-bound slope factor: 2.0 $(mg/kg\text{-}day)^{-1}$ Central-estimate slope factor: 1.0 $(mg/kg\text{-}day)^{-1}$
Criteria for use: - Food chain exposure - Sediment or soil ingestion - Dust or aerosol inhalation - Dermal exposure, if an absorption factor has been applied - Presence of dioxin-like, tumor-promoting, or persistent congeners - Early-life exposure (all pathways)
LOW RISK AND PERSISTENCE Upper-bound slope factor: 0.4 $(mg/kg\text{-}day)^{-1}$ Central-estimate slope factor: 0.3 $(mg/kg\text{-}day)^{-1}$
Criteria for use: - Ingestion of water-soluble congeners - Inhalation of evaporated congeners - Dermal exposure if no absorption factor has been applied
LOWEST RISK AND PERSISTENCE Upper-bound slope factor: 0.07 $(mg/kg\text{-}day)^{-1}$ Central-estimate slope factor: 0.04 $(mg/kg\text{-}day)^{-1}$
Criteria for use: Congener or isomer analyses verify that congeners with more than 4 chlorines comprise less than 0.5% of total PCBs.

(a) USEPA. 2000c. Integrated Risk Information System (IRIS).

TABLE 4-6
TEFs FOR DIOXIN AND FURAN CONGENERS
SAUGET AREA 1 EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSM

Constituent	CAS NO.	TEF (a)
Dioxins		
2,3,7,8-TetraCDD	1746-01-6	1
1,2,3,7,8-PentaCDD	40321-76-4	1
1,2,3,4,7,8-HexaCDD	39227-28-6	0.1
1,2,3,6,7,8-HexaCDD	57653-85-7	0.1
1,2,3,7,8,9-HexaCDD	19408-74-3	0.1
1,2,3,4,6,7,8-HeptaCDD	35822-39-4	0.01
OctaCDD	3268-87-9	0.0001
2,3,7,8-PentaCDDs	NA	NA
2,3,7,8-HexaCDDs	NA	NA
2,3,7,8-HeptaCDDs	NA	NA
Furans		
2,3,7,8-TetraCDF	51207-31-9	0.1
1,2,3,7,8-PentaCDF	57117-41-6	0.05
2,3,4,7,8-PentaCDF	57117-31-4	0.5
1,2,3,4,7,8-HexaCDF	70648-26-9	0.1
1,2,3,6,7,8-HexaCDF	57117-44-9	0.1
1,2,3,7,8,9-HexaCDF	72918-21-9	0.1
2,3,4,6,7,8-HexaCDF	60851-34-5	0.1
1,2,3,4,6,7,8-HeptaCDF	67562-39-4	0.01
1,2,3,4,7,8,9-HeptaCDF	55673-89-7	0.01
OctaCDF	39001-02-0	0.0001
2,3,7,8-HexaCDFs	NA	NA
2,3,7,8-HeptaCDFs	NA	NA

Notes:
CAS - Chemical Abstracts Service.
CDD- Chorodibenzodioxin
CDF - Chlorodibenzofuran.
TEF - Toxicity Equivalency Factor.
(a) - "Toxic Equivalency Factors for PCBs, PCDDs, PCDFs for Humans and Wildlife."
Van den Berg, et al. 1998.

5.0 EXPOSURE ASSESSMENT

The purpose of the exposure assessment is to predict the magnitude and frequency of potential human exposure to each of the COPC retained for quantitative evaluation in the HHRA. The first step in the exposure assessment process is the characterization of the setting of the site and surrounding area. Current and potential future site uses and potential receptors (i.e., people who may contact the impacted environmental media of interest) are then identified. Potential exposure scenarios identifying appropriate environmental media and exposure pathways for current and potential future site uses and receptors are then developed. Those potential exposure pathways for which COPCs are identified and are judged to be complete are evaluated quantitatively in the risk assessment. This information is used to develop or update the conceptual site model (CSM) for the site.

To estimate the potential risk to human health that may be posed by the presence of COPCs in environmental media in the study area, it is first necessary to estimate the potential exposure dose of each COPC for each receptor. The exposure dose is estimated for each constituent via each exposure route/pathway by which the receptor is assumed to be exposed. Reasonable maximum exposure (RME) scenarios, and most likely exposure (MLE) scenarios based on appropriate USEPA guidance are both evaluated in the quantitative risk assessment. Exposure dose equations combine the estimates of constituent concentration in the environmental medium of interest with assumptions regarding the type and magnitude of each receptor's potential exposure to provide a numerical estimate of the exposure dose. The exposure dose is defined as the amount of COPC taken into the receptor and is expressed in units of milligrams of COPC per kilogram of body weight per day (mg/kg-day). The exposure doses are combined with the toxicity values to estimate potential risks and hazards for each receptor.

This section contains seven subsections. Section 5.1 presents the updated CSM for the site. Section 5.2 identifies the potential exposure scenarios and receptors. Section 5.3 presents the methods for quantifying potential exposures. Section 5.4 presents the receptor-specific exposure parameters, and Section 5.5 presents the constituent-specific exposure parameters. Section 5.6 discusses the risk calculations.

5.1 *Conceptual Site Model*

To guide identification of appropriate exposure pathways for evaluation in the risk assessment, a CSM for human health was developed as part of the scoping activities in the HHRA Workplan (presented in Appendix A). The purpose of the CSM is to identify source areas, potential migration pathways of constituents from source areas to environmental media where exposure can occur, and to identify potential human receptors. The CSM is meant to be a "living" model that can be updated and modified as additional data become available.

The initial CSM for the site is presented in Figure (Appendix A) 2-1. Table (Appendix A) 5-1 presented the matrix of receptors and pathways by area and medium that would be considered for evaluation in the risk assessment. The CSM and the receptor area matrix have been updated based on a review of the analytical results and the COPC selection process. The updated CSM is presented in Figure 5-1. The updated receptor/area matrix is presented in Table 5-1. Both are discussed below.

5.1.1 Sites

In Sauget Area 1, the sites are identified as Sites G, H, I, L, M, and N. These are identified as source areas in the CSM (Figure 5-1). Constituents in the sites may leach to underlying groundwater. In accordance with the SSP, samples of wastes in the fill areas were analyzed by the Toxicity Characteristic Leaching Procedure (TCLP) to address potential leachate issues.

Site M is included in the UAO sediment removal action (Section 2.0), therefore, it is not evaluated further in the HHRA. COPCs were identified in samples of shallow groundwater in Site H, Site G, Site L, and in Site I and downgradient (west) of Site I. Groundwater is, therefore, identified as a secondary source in the CSM (Figure 5-1), and these COPCs are quantitatively evaluated in the HHRA. It should be noted that no COPCs were identified in groundwater south of Site L, with the exception of lead in a nonpotable use well in the residential area.

VOCs identified as COPCs in shallow groundwater may volatilize and infiltrate indoor air in overlying buildings and outdoor air, and these potential exposure pathways (Figure 5-1) are evaluated in the HHRA. Construction work may occur to depths at which shallow groundwater may be encountered by direct contact, and this pathway is evaluated in the HHRA. It is assumed that construction could occur to depths up to 30 feet bgs as some sewer lines in the area are at this depth. It is assumed that volatilization of VOCs to indoor or outdoor air can occur from groundwater up to this depth, although this pathway is more commonly evaluated for groundwater less than 15 feet bgs (MADEP, 1995).

1 * No COPCs were identified in surface soil in Site G, therefore, this medium is not further evaluated in the HHRA. COPCs were identified in surface soil in Sites H, I, L, and N. COPCs in surface soil may be suspended in dusts in outdoor air (no VOCs were identified as COPCs in site soils). Exposure to COPCs in outdoor air as well as direct contact with soils are evaluated as potential exposure pathways in the HHRA (Figure 5-1).

5.1.2 Dead Creek and Borrow Pit Lake

Historical information presented in the SSP demonstrates that the major source of COPCs in surface water and sediments in Dead Creek was past industrial and municipal discharges directly to the creek. There are no current discharges to the creek other than stormwater.

As noted in Section 2.0, a sediment removal action will be conducted in Site M, CS-B through CS-E, and including portions of CS-F between CS-E and Route 3 under a UAO with USEPA. Therefore, these areas are not evaluated in the HHRA.

Surface water and sediments in Dead Creek CS-F and the Borrow Pit Lake were collected and analyzed and evaluated as one area in the HHRA. No COPCs were identified in surface water and two COPCs (arsenic, PCBs) were identified in sediment. Therefore, sediment is evaluated quantitatively in the HHRA as a potential exposure pathway (Figure 5-1). Fish in the Borrow Pit Lake may have accumulated constituents present in surface water and/or sediments, and one COPC (arsenic) was identified in fish tissue. Therefore, fish tissue is evaluated quantitatively in the HHRA as a potential exposure pathway (Figure 5-1).

5.1.3 Transect Areas

Surface and subsurface soil samples were collected and analyzed from transects in the residential/commercial/undeveloped areas. The SSP sampling program for this area was developed to address the potential for sediments in Dead Creek to serve as a source of constituents to soils in the surrounding flood plain via overbank flooding. Transects were located on alternating sides of Dead Creek from the sites south to Route 3 (Figure 3-1), with the intention of determining if there was a north to south concentration gradient of constituents. Sampling locations on the transects extended out east or west of the creek, with the intention of determining if there was a concentration gradient of constituents extending out from the creek.

A review of the data indicate that Dead Creek is not serving as a source of constituents to soils in the surrounding flood plain. The COPCs identified in transect soils in Section 3.0 are likely representative of background conditions in the area, as discussed in Section 3.0.

No COPCs were identified in surface or subsurface soil in Transects 1 and 2, which are the transects located closest to the fill areas. In addition, no COPCs were identified in subsurface soils in Transects 3, 5, and 7. Therefore, these areas are not further evaluated in the HHRA.

COPCs identified in surface and subsurface soils in the remaining transects are included for quantitative evaluation in the HHRA. Constituents in surface soils may be suspended as dust in outdoor air, and this pathway is evaluated in the HHRA (no VOCs were identified as COPCs in transect soils). COPCs in soils may also be taken up by garden produce, therefore, exposure to COPCs in outdoor air and garden produce as well as direct contact with soils are evaluated as potential exposure pathways in the HHRA (Figure 5-1).

The exposure scenarios (exposure pathways, exposure routes, and receptors) quantitatively evaluated in the risk assessment have been identified based on this current CSM. They are discussed in the next section.

5.2 Identification of Potential Exposure Scenarios and Receptors

Exposure scenarios are developed on the basis of the CSM for a site. A general identification of exposure pathways, exposure routes, and receptors is provided in the CSM (Figure 5-1). A more detailed summary is provided in Table 5-1, the receptor/area matrix. Table 5-1 was derived from Table (Appendix A) 5-1, based on the updated CSM presented above and results of the COPC identification process presented in Section 3.0.

5.2.1 Sites

Sauget Area 1 sites have been used for industrial purposes for many years (since the 1930s or earlier) and use of these areas is expected to remain industrial. The sites within Sauget Area 1 are zoned commercial/industrial and it is likely that the sites will continue to be used well into the reasonably foreseeable future for commercial/industrial purposes. Therefore, the sites were evaluated for non-residential use scenarios. However, at the request of USEPA, Site N was evaluated for both a nonresidential as well as a hypothetical future residential scenario.

Receptors were identified for the sites based on the CSM and the COPCs identified in media in the areas. COPCs were identified in groundwater in Site G and in soils and groundwater in Sites H, I, and L. COPCs were identified in Site N surface soil for the residential scenario only. Therefore, Site N exposure scenarios are addressed in Section 5.2.3 with the transect soils.

An on-site outdoor industrial worker and a trespassing teen are evaluated for potential exposure to COPCs in surface soil via incidental ingestion and dermal contact, and via inhalation of COPCs that may be suspended as dusts from soils and to COPCs that may volatilize into outdoor air from underlying groundwater.

An on-site construction/utility worker is evaluated for potential exposure to COPCs in surface and subsurface soil via incidental ingestion and dermal contact, and via inhalation of particulates suspended during excavation activity. Construction/utility work is assumed to occur up to depths of 30 feet bgs as noted above. Due to the shallow depth of groundwater, the construction/utility worker may contact groundwater during excavation. Therefore, the construction worker is assumed to be exposed to COPCs in groundwater via incidental ingestion and dermal contact, and via inhalation of COPCs volatilized from standing water in an excavation trench. Because the sites are areas of known waste disposal, it is assumed that appropriate safeguards are used when excavating in waste areas (gas monitoring, appropriate personal protective equipment). This assumption is addressed in the remedy discussion in Section 8, where the use of institutional controls to enforce these safeguards is discussed.

Due to the presence of VOCs in groundwater in Sites G, H, I and L, an on-site indoor industrial worker will be evaluated for potential exposure to COPCs via inhalation of volatile constituents present in indoor air due to vapor intrusion from groundwater. It is unlikely that the indoor worker receptor would be exposed to soils to the same extent as an outdoor worker, therefore, this pathway was concluded to be insignificant and was not quantitatively evaluated in the risk assessment for this receptor.

5.2.2 Dead Creek and Borrow Pit Lake

Access to Dead Creek is generally uncontrolled except for CS-B, which is secured with a fence. Since sediments in CS-B, C, D and E and the upstream portion of F will be excavated and contained on-site as part of a Time Critical Removal Action, exposure to sediments is not considered a potential exposure scenario in these creek segments. Although access to Borrow Pit Lake is uncontrolled, it is located on private property, and access is very difficult due to its setting. Again, although access is difficult, recreational fishing may occur in Borrow Pit Lake. Borrow Pit Lake and the majority of CS-F that are not included in the sediment removal action are evaluated as one area in the HHRA.

2 does disagree

COPCs were identified in sediment but not in surface water. Therefore, a recreational receptor (i.e., *teenager) could be exposed to COPCs in sediment of CS-F and the Borrow Pit Lake while wading or swimming. This scenario was evaluated in the HHRA.

One COPC was identified in fish tissue collected from Borrow Pit Lake. Therefore, a recreational fisher receptor potentially exposed to COPCs in sediment while wading and via ingestion of fish was evaluated in the HHRA.

5.2.3 Transect Areas

The transect areas consist of residential, commercial and undeveloped land. Therefore, both residential and non-residential exposure scenarios were evaluated for these areas. COPCs for a residential scenario were identified in surface soil in Transects 3 through 7 and Site N. COPCs for an industrial scenario were identified in surface soil in Transects 3, 4, 6, and 7, and in subsurface soil in Transects 4 and 6. The only COPC identified in groundwater in the transect area was lead in a non-potable use well.

An indoor industrial worker was not evaluated in the transect areas as no VOCs were identified as COPCs in groundwater. An outdoor industrial worker was evaluated for potential exposure to COPCs in surface soil via incidental ingestion and dermal contact, and via inhalation of COPCs that may be suspended as dusts from soils.

A construction worker receptor was evaluated for potential exposure to COPCs in surface and subsurface soil via incidental ingestion and dermal contact, and via inhalation of particulates suspended during excavation activity. Construction/utility work is assumed to occur up to depths of 30 feet bgs as noted above. Due to the shallow depth of groundwater, the construction/utility worker may contact groundwater during excavation. Therefore, the construction worker is assumed to be exposed to COPCs in groundwater via incidental ingestion and dermal contact with standing water in an excavation trench. Volatile inhalation is not included as no VOCs were identified in groundwater in this area.

A resident receptor is evaluated for potential exposure to COPCs in surface soils via incidental ingestion and dermal contact, and via inhalation of COPCs that may be suspended as dusts from soils. Inspection of the area indicated that some residences have vegetable gardens. As COPCs may be taken up by plant material and subsequently ingested, a produce consumption pathway is included in the HHRA. A trespassing teen receptor was not evaluated in the transects and Site N due to the inclusion of the residential scenario in these areas; the residential scenario provides a more conservative evaluation.

Groundwater is not used as a source of drinking water in the area. However, there are some private wells in the area that may be used for outdoor household activities. As noted above, a single COPC, lead, was identified in a non-potable use well in this area. Therefore, potential exposure to groundwater via incidental ingestion and dermal contact during outdoor use of water from a well is evaluated in the HHRA.

5.3 Quantification of Potential Exposures

To estimate the potential risk to human health that may be posed by the presence of COPCs at the site, it is first necessary to estimate the potential exposure dose of each COPC. The exposure dose is estimated for each constituent via each exposure pathway by which the receptor is assumed to be exposed. Exposure dose equations combine the estimates of constituent concentration in the environmental medium of interest with assumptions regarding the type and magnitude of each receptor's potential exposure to provide a numerical estimate of the exposure dose. The exposure dose is defined as the amount of COPC taken into the receptor and is expressed in units of milligrams of COPC per kilogram of body weight per day (mg/kg-day).

Exposure doses are defined differently for potential carcinogenic and noncarcinogenic effects. The Chronic Average Daily Dose (CADD) is used to estimate a receptor's potential intake from exposure to a COPC with noncarcinogenic effects. According to USEPA (1989a), the CADD should be calculated by averaging the dose over the period of time for which the receptor is assumed to be exposed. Therefore, the averaging period is the same as the exposure duration. For COPCs with potential carcinogenic effects, however, the Lifetime Average Daily Dose (LADD) is employed to estimate potential exposures. In accordance with USEPA (1989a) guidance, the LADD is calculated by averaging exposure over the receptor's assumed lifetime (70 years). Therefore, the averaging period is the same as the receptor's assumed lifetime. The standardized equations for estimating a receptor's average daily dose (both lifetime and chronic) are presented below, followed by descriptions of receptor-specific exposure parameters (Section 5.4) and constituent-specific parameters (Section 5.5).

5.3.1 Estimating Potential Exposure from Ingestion of and Dermal Contact with Soil or Sediment

Average Daily Dose (Lifetime and Chronic) Following Incidental Ingestion of Soil or Sediment (mg/kg-day):

$$ADD = \frac{CS \times IR \times EF \times ED \times AAF_o \times CF}{BW \times AT}$$

where:

ADD	=	Average Daily Dose (mg/kg-day)
CS	=	Soil concentration (mg/kg soil)
IR	=	Ingestion rate (mg soil/day)
EF	=	Exposure frequency (days)
ED	=	Exposure duration (year)
AAF_o	=	Oral-Soil Absorption Adjustment Factor (AAF) (unitless)
CF	=	Unit conversion factor (kg soil/10^6 mg soil)
BW	=	Body weight (kg)
AT	=	Averaging time (days)

Average Daily Dose (Lifetime and Chronic) Following Dermal Contact with Soil or Sediment (mg/kg-day):

$$ADD = \frac{CS \times SA \times AF \times EF \times ED \times AAF_d \times CF}{BW \times AT}$$

where:

ADD	=	Average Daily Dose (mg/kg-day)
CS	=	Soil concentration (mg/kg soil)

SA	=	Exposed skin surface area (cm^2/day)
AF	=	Soil to skin adherence factor (mg soil/cm^2)
EF	=	Exposure frequency (days)
ED	=	Exposure duration (year)
AAF_d	=	Dermal-Soil AAF (unitless)
CF	=	Unit conversion factor (kg soil/10^6 mg soil)
BW	=	Body weight (kg)
AT	=	Averaging time (days)

5.3.2 Estimating Potential Exposure via Inhalation

Average Daily Dose (Lifetime and Chronic) Following Inhalation of COPC (mg/kg-day):

$$ADD = \frac{CA \times IR \times AAF_i \times ET \times EF \times ED}{BW \times AT}$$

where:

ADD	=	Average Daily Dose (mg/kg-day)
CA	=	Air concentration (mg/m^3)
IR	=	Inhalation rate (m^3 /hr)
AAF_i	=	Inhalation AAF (unitless)
ET	=	Exposure time (hours/day)
EF	=	Exposure frequency (days)
ED	=	Exposure duration (year)
BW	=	Body weight (kg)
AT	=	Averaging time (days)

5.3.3 Estimating Potential Exposure from Groundwater/Surface Water

Average Daily Dose (Lifetime and Chronic) Following Ingestion of Water (mg/kg-day):

$$ADD = \frac{CW \times IR \times EF \times ED \times AAF_o \times CF}{BW \times AT}$$

where:

ADD	=	Average Daily Dose (mg/kg-day)
CW	=	Water concentration (mg/L)
IR	=	Water ingestion rate (L/day)
EF	=	Exposure frequency (days)
ED	=	Exposure duration (year)
AAF_o	=	Oral-water AAF (unitless)
BW	=	Body weight (kg)
AT	=	Averaging time (days)

Average Daily Dose (Lifetime and Chronic) Following Dermal Contact with Water (mg/kg-day):

$$ADD = \frac{CW \times SA \times PC \times ET \times EF \times ED \times AAF_d \times CF}{BW \times AT}$$

where:

ADD	=	Average Daily Dose (mg/kg-day)
CW	=	Water concentration (mg/L)
SA	=	Exposed skin surface area (cm^2/day)
PC	=	Dermal permeability constant (cm/hr)
ET	=	Exposure time (hours/day)
EF	=	Days exposed per year (day/365 day)
ED	=	Years exposed (year)
AAF_d	=	Dermal-water AAF (unitless)
CF	=	Unit conversion factor ($L/10^3 cm^3$)
BW	=	Body weight (kg)
AT	=	Averaging time (year)

5.3.4 Estimating Potential Exposure From Food Consumption

Average Daily Dose (Lifetime and Chronic) Following Food Consumption (mg/kg-day):

$$ADD = \frac{CF \times IR \times AAF \times EF \times ED}{AT \times BW}$$

where:

ADD	=	Average Daily Dose (mg/kg-day)
CF	=	Concentration in food (mg/kg)
IR	=	Ingestion rate (kg/day)
AAF	=	Oral-diet AAF (unitless)
EF	=	Exposure frequency (days)
ED	=	Exposure duration (days)
AT	=	Averaging time (days)
BW	=	Body weight (kg)

5.4 Receptor-Specific Exposure Parameters

The following subsections present the parameters that were used to evaluate each of the potential receptors in the HHRA. Both RME and MLE scenarios were evaluated for each receptor. Receptor-specific exposure parameters are presented in Section 5.4.1. Exposure factors common to several of the receptors are discussed in Section 5.4.2 and 5.4.3. Both the receptor-specific and the common exposure parameters were presented in the HHRA Workplan (Appendix A).

5.4.1 Receptor-Specific Exposure Parameters

Exposure assumptions for the indoor industrial worker under the RME and MLE scenarios are shown in Table 5-2.

Exposure assumptions for the outdoor industrial worker under the RME and MLE scenarios are shown in Table 5-3.

Exposure assumptions for the trespassing teenager under the RME and MLE scenarios are shown in Table 5-4.

Exposure assumptions for the construction/utility worker under the RME and MLE scenarios are shown in Table 5-5.

Table 5-6 presents the exposure assumptions for evaluation of a child resident (0 to 6 yrs of age) and an adult resident under RME and MLE scenarios. Because of the differences in activity patterns and sensitivity to potential constituent exposures, two age groups for the resident receptor are evaluated: the young child (age 0 to 6 years, 15 kg body weight) and the adult resident, 70 kg body weight) (USEPA, 1991b). The young child's lower body weight, combined with a high intake rate for soil exposures results in a higher dose per kilogram of body weight than for other age groups. This receptor is then the most sensitive to the noncarcinogenic health effects of constituents and is, therefore, the target receptor for the noncarcinogenic analysis. Because carcinogenic effects are assumed to be additive over a lifetime, it is more conservative to evaluate potentially carcinogenic effects of COPC over the period of residence at the site. The resident, as both child and adult, is thus evaluated for potential carcinogenic effects of COPC.

Exposure assumptions for the recreational teenager under the RME and MLE scenarios are shown in Table 5-7.

The exposure assumptions for the recreational adult fish ingestion pathway for the RME and MLE receptors are summarized in Table 5-8.

5.4.2 Soil Ingestion Rate – Adult Construction Worker

Incidental soil ingestion occurs at all ages as a result of hand-to-mouth activities. Currently, there are little or no reliable quantitative data available for estimating adult soil ingestion rates. USEPA risk assessment guidance suggests a soil ingestion rate of 100 mg/day for adults in a residential scenario (USEPA, 1989a, 1991b), and a soil ingestion rate of 50 mg/day for adults in an industrial scenario (USEPA, 1991b).

USEPA presented an estimate of a soil ingestion rate for adults doing yard work of 480 mg/day in their supporting evidence for the commercial/industrial soil ingestion rate of 50 mg/day in the "Standard Default Exposure Factors" Directive (USEPA, 1991b); the 480 mg/day value was not presented in the table of default exposure factors. The Agency states: "For certain outdoor activities in the commercial/industrial setting (e.g., construction or landscaping), a soil ingestion rate of 480 mg/day may be used; however, this type of work is usually short-term and is often dictated by the weather. Thus, exposure frequency would generally be less than one year and exposure duration would vary according to site-specific construction/maintenance plans." However, some regions and state agencies have stipulated the use of this value to evaluate a construction worker exposure scenario. The Hawley (1985) study, which is the basis for the soil ingestion rate of 480 mg/day, was recently reviewed by the USEPA (USEPA, 1997a), which stated that, "Given the lack of supporting measurements, these estimates must be considered conjectural."

In the Hawley (1985) study, the author assumed that soil adheres to the surface area of the hands at a loading of 3.5 mg/cm^2. This value was based on a layer of soil on skin assumed to be 0.005 cm deep, a soil density of 1.5 g/cm^2, and 50% void space. Using the author's derived soil-to-skin adherence loading of 3.5 mg/cm^2 and assuming that the amount of soil covering a fraction of the hands (approximately 70 cm^2) is ingested twice a day, Hawley calculated a soil ingestion rate of 480 mg/day.

Hawley's 1985 analysis was one of the first published health risk assessments and was performed before any of the quantitative fecal tracer soil ingestion studies for either children or adults were conducted (Calabrese et al., 1989; Davis et al., 1990; Clausing et al., 1987; Calabrese et al., 1990). Thus, the estimate of 480 mg/day predates all of our current knowledge about soil ingestion among both children and adults, as well as recent published data on soil-to-skin adherence rates.

In 1993, USEPA sponsored a workshop to evaluate soil-to-skin adherence data. As a result, a study to determine a more accurate characterization of soil-to-skin adherence was sponsored by the USEPA and conducted by John C. Kissel and associates at the University of Washington (Kissel et al., 1996; Holmes et al., 1998). The intent of this study was to resolve uncertainties and develop more accurate measures of soil-to-skin loading rates for individuals involved in various occupational and recreational activities. As reported in the Exposure Factors Handbook (EFH) (USEPA ,1997a), soil loading on skin surfaces as a result of various occupational and recreational activities was directly measured. This study indicates that soil loadings vary with the type of activity and the body parts contacted. As one would expect, adherence appears to be greatest during outdoor activities such as farming and gardening, and more soil/dust tends to adhere to the hands and knees than to other areas of the body.

Average hand soil loading factors are presented in the EFH (USEPA, 1997a) for the adult outdoor workers evaluated by Kissel and Holmes. In every case, soil adherence during occupational exposure was measured to be considerably lower than Hawley's estimate of 3.5 mg/cm^2. The range of soil adherence loadings measured by Kissel and Holmes falls within the USEPA range of 0.2 to 1.0 mg/cm^2 (USEPA, 1992b).

For this evaluation, the construction worker receptor is assumed to be exposed to COPC in surface and subsurface soils during excavation activity. Based on this exposure scenario, the "farmer" receptor provided in the EFH is considered to provide an upper-bound estimate of soil adherence. A soil ingestion rate can be calculated by substituting the soil adherence value for the receptor for the estimated value derived by Hawley (1985), as follows:

$$\frac{480\ mg/day}{3.5\ mg/cm^2} = \frac{ingestion\ rate\ (mg/day)}{soil\ adherence\ (mg/cm^2)}$$

do we agree ? sounds funny ?

The soil adherence value for the "farmer" is 0.47 mg/cm^2. The calculated soil ingestion value is 64 mg/day; therefore, a soil ingestion rate of 64 mg/day is used for the MLE construction worker receptor in this risk evaluation.

Additional support for this value comes from a new paper by Kissel and coworkers (Kissel et al., 1998) that presents the results of a study of the transfer of soil from hand to mouth by intentional licking. Soil was loaded onto the skin by pressing the hand onto soil, and the amount transferred to the mouth was measured. The thumb sucking, finger mouthing, and palm licking activities resulted in geometric mean soil mass transfers of 7.4 to 16 mg per event. The author concludes that "transfer of 10 mg or more of soil from a hand to the oral cavity in one event is possible, but requires moderate soil loading and more than incidental hand-to-mouth contact." However, "the fraction of soil transferred from hand to mouth that is subsequently swallowed is unknown but may be less than 100 percent." In addition, "the adult volunteers in this study reported that the presence of roughly 10 mg of soil in the mouth is readily detected (and unpleasant). Repeated unintentional ingestion of that mass of soil by adults therefore seems unlikely. In light of this observation, the 480 mg per day estimate [of Hawley, 1985] would require hundreds or perhaps thousands of hand-to-mouth contacts that resulted in soil transfer per day."

For the RME scenario, a soil ingestion rate of 100 mg/day is assumed for the construction worker. Agree? This is the adult soil ingestion rate provided by USEPA (1991b). For the MLE scenario, the soil ingestion rate of 64 mg/kg derived above was used.

5.4.3 Frequency of Exposure to COPC in Soil

A meteorological factor is generally used to account for the fraction of the year during which exposure to constituents in soils may occur (Sheehan et al., 1991; USEPA, 1989a). It is reasonable to assume that direct contact with soil or intrusive activities will not occur for residential receptors during inclement weather, i.e., when it is raining or snowing, when the ground is wet or frozen, or when snow or ice (32 degrees F) are covering the ground. Thus the frequency of contact with potentially impacted soil is adjusted for these site-specific meteorological conditions (USEPA, 1989a).

There are only a few metrics that can be used to describe the fraction of the year when meteorological conditions are likely to limit exposure. These include temperature and the amount of precipitation per day and per year, which includes rain, snow and ice. While measures are collected hourly, the National Weather Service (NWS, 1986-1995) reports the number of days when precipitation is greater than 0.01 inches (one one-hundredth), greater than 0.1 inches (one tenth), and greater than 1 inch in their annual summary data. The number of days with precipitation greater than 0.1 inches is selected as the best representation of when exposure is likely to be limited by snow, rain, or ice. The National Oceanographic and Atmospheric Administration (NOAA) provides daily temperature data. It is assumed that exposure to soils is limited by temperatures less than 32 degrees F. Therefore, limiting the assumption of exposure to soils to those days with less than 0.1 inch of precipitation and temperatures above 32 degrees F is reasonable.

Very conservative .1" can still work 32° mean still work

Based on ten years of meteorological data (1986-1995) provided by NOAA (1996), a meteorological factor is derived for use in the exposure equations. On the average, 66 days/year in this area receive 0.1 or greater inches of precipitation, and there are typically 27 days/year with a mean temperature of 32 degrees F or below. Accounting for days when both events occur (assumed to be 10% of the rain days or 6 days/year), the number of inclement days, 87, can be calculated (27 + 66 – 6 = 87). It is assumed that these days are evenly spaced throughout the course of the year. The meteorological factor is then calculated (87/365 = 24%). Thus it is assumed that exposure to soils will not occur for the "receptor" 24% of the assumed days of exposure (exposure frequency) due to weather restrictions.

The choice of a precipitation target of 0.1 inches is in keeping with guidance provided in the Compilation of Air Pollution Emission Factors, which assumes that soil suspension will not occur on days with more than 0.01 inches of precipitation (USEPA, 1995b). It is probable, however, that this metric both over- and under-estimates the potential exposure in some conditions. For, example, it is possible that some exposure to soils may occur on days when it rains just over 0.1 inches in the early morning and then the ground dries during the course of the day. Alternatively, significant rainfall, such as greater than 1 inch, is likely to saturate the soil for consecutive days, and several inches of snow (which may fall all on one day with one storm) may cover the ground and inhibit direct contact for several days. With both of these considerations in mind, it is likely that a meteorological factor based on inclement days defined as precipitation greater than 0.1 inches and average temperatures less than 32 degrees F is reasonable.

NO

5.5 Constituent-Specific Parameters

There are several constituent-specific parameters used in the exposure equations above. These parameters are discussed below.

5.5.1 Exposure Point Concentrations

Exposure points are located where potential receptors may contact COPCs at or from the site. The concentration of COPCs in the environmental medium that receptors may contact must be estimated in order to determine the magnitude of potential exposure. The estimation of exposure point concentrations (EPCs) in media evaluated for the HHRA is discussed below.

5.5.1.1 Measured EPCs

The EPC for a human health risk assessment is defined as the 95% upper confidence limit (95% UCL) on the arithmetic mean concentration, or the maximum concentration, whichever is lower (USEPA, 1992a), for the RME scenario and the arithmetic mean concentration for the MLE scenario.

Summary statistics have been calculated for each COPC in each medium, as presented in Appendix B. As discussed in Section 3.0, before summary statistics were calculated, the following steps were taken for each COPC. If a constituent was detected in at least once in an area/medium combination, one-half the constituent's quantitation limit was used as a proxy concentration in the estimation of exposure point concentrations for those instances in which the constituent was reported as not detected. However, if the proxy concentration is greater than any detected value in that area/medium, the proxy concentration was removed from the calculation. This is consistent with USEPA guidance (USEPA, 1989a) which recognizes that high sample quantitation limits can lead to unrealistic concentration estimates. Duplicate sample analytical results were averaged, and the average used as the sample point concentration (USEPA, 1989b).

The equation used to calculate the 95% UCL is dependent upon the distribution of the data set. If data are normally distributed, the following equation is used (U.S. EPA, 1992a):

$$95\%\ UCL = \bar{x} + t(s/\sqrt{n})$$

where:

$\bar{x}$	=	mean of data
s	=	standard deviation of the data
t	=	student t-statistic
n	=	number of samples

If the data are lognormally distributed, the 95% UCL is calculated using the transformed data set and the H-statistic (U.S. EPA, 1992a). The data are "transformed" by using the natural logarithmic function, i.e., by calculating ln(x) for each x value in the data set.

$$e^{(\bar{x} + 0.5s^2 + sH / \sqrt{n-1})}$$

Where:

e	=	base of the natural log, equal to 2.718
$\bar{x}$	=	mean of the transformed data
s	=	standard deviation of the transformed data
H	=	H-statistic
n	=	the number of samples in the population

H-statistic and t-statistic values were obtained from Gilbert (1987).

Agree

The Shapiro-Wilk Test for Normality (W-test) is used to determine which 95% UCL value is appropriate for use as an EPC for each COPC. The results of the W-test indicate whether the data set is more likely to be normally or lognormally distributed. The UCL based on the student t-statistic is selected where the data set is more likely to be normally distributed, while the UCL based on the H-statistic is selected where the data set is more likely to be lognormally distributed. The W-test values were calculated and compared for the log-transformed and untransformed data sets. If the log-transformed data have the higher W-test value, the data are assumed to be more lognormally distributed, and the H-statistic 95% UCL value is the appropriate UCL. Similarly, if the untransformed data have the higher W-test value, the data are assumed to be more normally distributed, and the t-statistic 95% UCL is the appropriate UCL.

EPCs for each of the COPC identified in Section 3.0 have been selected using the above described procedure. The tables in Appendix B (Summary Statistics) present for each constituent detected the W-test results, the log-transformed and untransformed 95% UCLs, the selected 95% UCL, and the selected EPC. The EPCs for each medium and scenario are presented in Tables 5-14 through 5-28 for the RME scenario. The EPCs for each medium and scenario are presented in Tables 5-29 through 5-40 for the MLE scenario.

5.5.1.2 Modeled EPCs

Some pathways required modeling to derive the EPCs. These pathways include volatile constituents in groundwater migrating upwards and infiltrating into indoor air, outdoor air and excavation air, and generation of fugitive dusts from undisturbed soils as well as during construction activities.

The model used to predict indoor air concentrations of VOCs for evaluation of the indoor worker receptor was the model of Johnson and Ettinger recommended by the USEPA (1996a and 1997c) to predict concentrations of COPCs migrating from groundwater to indoor air of an overlying building. Appendix K presents the model calculations and output.

Calculation of outdoor air concentrations of VOCs in groundwater due to exposure to groundwater in an excavation trench is presented in Appendix L. These concentrations were used to evaluate the construction worker receptor.

Concentrations of volatile COPCs in outdoor air due to migration from groundwater was estimated using the methodology recommended by the American Society for Testing and Materials (ASTM, 1995). Appendix M presents the model calculations and output. These concentrations were used to evaluate the outdoor worker and the trespasser receptors.

The calculation of concentrations of inorganic and semivolatile organic COPCs bound to soil in fugitive dust involves multiplying the soil exposure point concentrations by the concentration of dust in air as follows:

1) Ambient Air:

COPC concentration in ambient air (mg/m^3) = Exposure point concentration in soil (mg/kg soil) x Dust concentration (kg soil/m^3)

The dust concentration in air used in the evaluation of ambient outdoor air pathways in this risk evaluation is the inverse of the particulate emission factor (PEF) derived in accordance with USEPA guidance (USEPA, 1996a). Tables 5-18, 5-19 and 5-20 present the PEF calculations used for the various fill areas and transects.

2) Excavation Air (i.e., during construction activities):

COPC concentration in excavation air (mg/m^3) = Exposure point concentration in soil (mg/kg soil) x Dust concentration (mg soil/m^3) x Unit correction factor (1 kg/10^6 mg)

/ Agree ?

The dust ~~concentration in~~ air used in the evaluation of excavation air pathways in this risk evaluation is 60 ug/m^3. This value is the recommended concentration of respirable particulate with a mean diameter of 10 microns or less (PM10) for excavation activities (MADEP, 1995).

COPC concentrations in homegrown produce are dependent upon the potential for direct uptake of COPCs from soil through plant roots and will be estimated via the following equation:

COPC Concentration in Produce (mg COPC/kg plant tissue) = Concentration of COPC in soil (mg COPC/kg Soil) x Root Uptake Factor (unitless)

The root uptake factor accounts for uptake from soil to the homegrown produce. Constituent-specific root uptake factors were obtained from USEPA (1998d). Methodology provided by USEPA (1998d) was used. The calculation of produce EPCs is discussed in Appendix N.

5.5.2 Absorption Adjustment Factors

Bioavailability is the measure of the degree to which a chemical may be systemically absorbed following exposure. In accordance with USEPA guidance (USEPA, 1989a, 1992c), absorption adjustment factors (AAFs) for bioavailability will be used in conducting this risk evaluation. To estimate the potential risk to human health that may be posed by the presence of COPCs in various environmental media (such as soil, sediment, water or air), it is first necessary to estimate the human exposure dose of each chemical. The exposure dose is then combined with an estimate of the toxicity of the chemical to produce an estimate of risk posed to human health.

The estimate of toxicity of a chemical, termed the toxicity value, can be derived from human epidemiological data, but it is most often derived from experiments with laboratory animals. The toxicity value can be calculated based on the administered dose of the chemical (similar to the human exposure dose) or, when data are available, based on the absorbed dose, or internal dose, of the chemical.

In animals, as in humans, the administered dose of a chemical is not necessarily completely absorbed. Moreover, differences in absorption exist between laboratory animals and humans, as well as between different media and routes of exposure. Therefore, it is not always appropriate to directly apply a toxicity value to the human exposure dose. In many cases, a correction factor in the calculation of risk is needed to account for differences between absorption in the toxicity study and absorption likely to occur upon human exposure to a chemical. Without such a correction, the estimate of human health risk could be over- or under-estimated.

This correction factor is termed the absorption adjustment factor, or AAF. The AAF is used to adjust the human exposure dose so that it is expressed in the same terms as the doses used to generate the dose-response curve in the dose-response study. The AAF is the ratio between the estimated human absorption for the specific medium and route of exposure, and the known or estimated absorption for the laboratory study from which the dose-response value was derived.

$$\text{AAFs} = \frac{\textbf{fraction absorbed in humans for the environmental exposure}}{\textbf{fraction absorbed in the dose - response study}}$$

The use of an AAF allows appropriate adjustments to be made to the administered dose of a chemical when the efficiency of absorption between environmental exposure and experimental exposure is known or expected to differ because of physiological effects and/or matrix or vehicle effects.

AAFs can have numerical values less than one or greater than one. When the toxicity curve is based on administered dose data, and if it is estimated that the fraction absorbed from the site-specific exposure or medium is the same as the fraction absorbed in the laboratory study, then the AAF is 1.0. This does not mean that there is 100% absorption, only that the magnitude of absorption is the same in both cases. There are situations in which it is expected that the fraction absorbed from a site-related exposure would be higher than that in the laboratory study. There are also situations where the reverse could occur. Thus, use of AAFs provides more accurate and more realistic estimates of potential human health risk. In the absence of detailed toxicological information on a COPC, the following default AAF values are generally employed. A default AAF value of 0.01 is used for dermal exposure to organics, a value of 0.001 is used for dermal exposure to inorganics (USEPA, 2000a), and a value of 1.0 is employed for all other routes of exposure. Agree ?

Support for the Use of AAFs in Agency Guidance

The use of absorption factors is recommended by USEPA for use in risk assessment when the "medium of exposure in the site exposure assessment differs from the medium of exposure assumed by the toxicity value" (USEPA, 1989a). In more recent guidance (USEPA, 1992c), USEPA states:

> The applied dose, or the amount that reaches exchange boundaries of the skin, lung or gastrointestinal tract, may often be less than the potential dose if the material is only partly bioavailable. Where data on bioavailability are known, adjustments to the potential dose to convert it to applied dose and internal dose may be made.
>
> This may be done by adding a bioavailability factor (range: 0 to 1) to the dose equation. The bioavailability factor would then take into account the ability of the chemical to be extracted from the matrix, absorption through the exchange boundary, and any other losses between ingestion and contact with lung or gastrointestinal tract.

AAFs used in this risk assessment are presented in Table 5-41. Appendix O presents the derivations of the AAFs.

5.5.3 Skin Permeability Constants

The estimation of exposure doses resulting from incidental dermal contact with groundwater requires the use of a dermal permeability constant (PC) in units of centimeters per hour (cm/hr). This method assumes that the behavior of constituents dissolved in water is described by Fick's Law. In Fick's Law, the steady-state flux of the solute across the skin ($mg/cm^2/hr$) equals the permeability constant (kp, cm/hr) multiplied by the concentration difference of the solute across the membrane (mg/cm^3). This approach is discussed by USEPA (USEPA, 1989a; 1992b).

The PC values were derived from USEPA's Guidance for Dermal Exposure Assessment: Principles and Applications (USEPA, 1992b). Tables 5-3 and 5-7 of this guidance document list PC values for constituents commonly found at disposal sites. PC's used in this risk assessment are presented in Table 5-42. Calculated PC's are presented in Table 5-43.

5.6 Exposure Dose Calculations

Appendix P presents the exposure dose and risk calculation spreadsheets. The risk results are discussed in Section 6.0.

TABLE 5-1
RECEPTOR/AREA MATRIX
SAUGET AREA 1 EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Receptor / **Medium** / **Secondary Medium (Pathways)**	**EXPOSURE AREAS**											
	SITES						**TRANSECTS**					
	G (a)	**H (b)**	**I (b)**	**L (b)**	**N (c)**	**BPL and CS-F**	**3 (d)**	**4 (d)**	**5 (d)**	**6 (d)**	**7 (d)**	**Total**
Indoor Industrial Worker (IW)												
Groundwater	IW-RME-G	IW-RME-H	IW-RME-I	IW-RME-L								
Indoor Air (inh)	IW-MLE-G	IW-MLE-H	IW-MLE-I	IW-MLE-L								8
Outdoor Industrial Worker (OW)												
Surface Soil (ing/derm)												
Outdoor Air (inh)												
Groundwater	OW-RME-G	OW-RME-H	OW-RME-I	OW-RME-L			OW-RME-T-3	OW-RME-T-4		OW-RME-T-6	OW-RME-T-7	
Outdoor Air (inh)	OW-MLE-G	OW-MLE-H	OW-MLE-I	OW-MLE-L			OW-MLE-T-3	OW-MLE-T-4		OW-MLE-T-6	OW-MLE-T-7	16
Construction Worker (CW)												
Surface Soil (ing/derm)												
Outdoor Air (inh)												
Subsurface Soil (ing/derm)												
Outdoor Air (inh)												
Groundwater (ing/derm)	CW-RME-G	CW-RME-H	CW-RME-I	CW-RME-L			CW-RME-T-3	CW-RME-T-4		CW-RME-T-6	CW-RME-T-7	
Outdoor Air (inh)	CW-MLE-G	CW-MLE-H	CW-MLE-I	CW-MLE-L			CW-MLE-T-3	CW-MLE-T-4		CW-MLE-T-6	CW-MLE-T-7	16
Trespassing Teenager (TT)												
Surface Soil (ing/derm)												
Outdoor Air (inh)												
Groundwater	TT-RME-G	TT-RME-H	TT-RME-I	TT-RME-L								
Outdoor Air (inh)	TT-MLE-G	TT-MLE-H	TT-MLE-I	TT-MLE-L								8
Recreational Teen (RT)												
Sediment (ing/derm)						RT-RME-CS-F						
						RT-MLE-CS-F						2
Recreational Fisher (RF)												
Sediment (ing/derm)						RF-RME-F						
Fish Tissue (ing)						RF-MLE-F						2
Resident (RES)												
Surface Soil (ing/derm)												
Outdoor Air (inh)												
Groundwater (ing/derm)					RES-RME-N		RES-RME-T-3	RES-RME-T-4	RES-RME-T-5	RES-RME-T-6	RES-RME-T-7	
Produce (ing)					RES-MLE-N		RES-MLE-T-3	RES-MLE-T-4	RES-MLE-T-5	RES-MLE-T-6	RES-MLE-T-7	12
Total:	8	8	8	8	2	4	6	6	2	6	6	64

Notes:

BPL - Borrow Pit Lake.	ing - ingestion.
COPC - Constituent of Potential Concern	inh - inhalation.
CS-F - Creek Segment F.	MLE - Most Likely Exposure
derm - dermal contact.	RME - Reasonable Maximum Exposure.

(a) - In Site G, COPCs identified in groundwater only.
(b) - In Sites H, I, and L, COPCs identified in groundwater and soil for industrial scenario.
(c) - In Site N, COPCs identified in soil for residential scenario only.
(d) - In Transect areas, no volatile organic constituents identified as COPCs in groundwater.

TABLE 5-2
SUMMARY OF POTENTIAL EXPOSURE ASSUMPTIONS - INDOOR INDUSTRIAL WORKER
SAUGET AREA 1 EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Parameter	**RME On-Site Indoor Worker**		**MLE On-Site Indoor Worker**	
Parameters Used in the Indoor Air Pathway				
Exposure Time (hr/day)	8	(a)	8	(a)
Exposure Frequency (days/year)	250	(b)	250	(b)
Exposure Duration (yr)	25	(b)	7	(c)
Inhalation Rate (m^3/hour)	1.6	(d)	1.0	(e)
Body Weight (kg)	70	(b)	70	(b)

Notes:
MLE - Most Likely Exposure.
RME - Reasonable Maximum Exposure.
(a) - USEPA, 1997a. Exposure Factors Handbook. 50th percentile time spent at work, males and females, all ages. Table 15-68.
(b) - USEPA, 1991b. Standard Default Exposure Factors.
(c) - USEPA, 1997a. Exposure Factors Handbook. Recommended value for occupational tenure listed in Table 1-2.
(d) - USEPA, 1997a. Exposure Factors Handbook. Inhalation rate for moderate activity.
(e) - USEPA, 1997a. Exposure Factors Handbook. Inhalation rate for light activity.

1/2/01

TABLE 5-3
SUMMARY OF POTENTIAL EXPOSURE ASSUMPTIONS - OUTDOOR INDUSTRIAL WORKER
SAUGET AREA 1 EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Parameter	RME Future Outdoor Industrial Worker		MLE Future Outdoor Industrial Worker	
Parameters Used in the Outdoor Air Pathway				
Exposure Time (hr/day)	8	(a)	8	(a)
Exposure Frequency (days/year)	190	(i)	190	(i)
Exposure Duration (yr)	25	(b)	7	(c)
Inhalation Rate (m^3/hour)	1.6	(d)	1	(e)
Body Weight (kg)	70	(b)	70	(b)
Parameters Used in the Surface Soil Pathway				
Exposure Frequency (days/year)	190	(i)	190	(i)
Exposure Duration (yr)	25	(b)	7	(c)
Soil Ingestion Rate (mg/day)	50	(f)	30	(j)
Skin Contacting Medium (cm^2)	3339	(g)	3339	(g)
Soil on Skin (mg/cm^2)	0.02	(h)	0.02	(h)
Body Weight (kg)	70	(b)	70	(b)

Notes:
MLE - Most Likely Exposure.
RME - Reasonable Maximum Exposure.
(a) - USEPA, 1997a. Exposure Factors Handbook. 50th percentile time spent at work, males and females, all ages. Table 15-68.
(b) - USEPA, 1991b. Standard Default Exposure Factors.
(c) - USEPA, 1997a. Exposure Factors Handbook. Recommended value for occupational tenure listed in Table 1-2.
(d) - USEPA, 1997a. Exposure Factors Handbook. Inhalation rate for moderate activity.
(e) - USEPA, 1997a. Exposure Factors Handbook. Inhalation rate for light activity.
(f) - USEPA, 1997a. Exposure Factors Handbook. Average soil ingestion rates listed in Table 1-2.
(g) - USEPA, 1997a. Exposure Factors Handbook. Represents 50th percentile values for males and females based on hands, forearms, and face.
(h) - USEPA, 1997a. Exposure Factors Handbook. See Table 5-9 for calculation.
(i) - Exposure frequency of 250 days (USEPA, 1991b) adjusted for percentage of days with inclement weather (24%), [250-(250*0.24) = 190]; see text.
(j) - Calabrese, E.J., et. al. 1990. Preliminary adult soil ingestion estimates; results of a pilot study. Regul. Toxicol. Pharmacol. 12L88-95. As cited in USEPA, 1997a. Exposure Factors Handbook. Low end of range.

1/2/01

TABLE 5-4
SUMMARY OF POTENTIAL EXPOSURE ASSUMPTIONS - TRESPASSING TEENAGER
SAUGET AREA 1 EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Parameter	**RME Trespassing Teenager (7 to 18 yrs)**		**MLE Trespassing Teenager (7 to 18 yrs)**	
Parameters Used in the Outdoor Air Pathway				
Exposure Time (hr/day)	2	(i)	2	(i)
Exposure Frequency (days/year)	26	(a)	13	(b)
Exposure Duration (yr)	11	(c)	11	(c)
Inhalation Rate (m^3/hour)	1.2	(j)	1	(k)
Body Weight (kg)	47	(h)	47	(h)
Parameters Used in the Surface Soil Pathway				
Exposure Frequency (days/year)	26	(a)	13	(b)
Exposure Duration (yr)	11	(c)	11	(c)
Soil Ingestion Rate (mg/day)	100	(d)	50	(e)
Skin Contacting Medium (cm^2)	3677	(f)	3677	(f)
Soil on Skin (mg/cm^2)	0.02	(g)	0.02	(g)
Body Weight (kg)	47	(h)	47	(h)

Notes:
MLE - Most Likely Exposure.
RME - Reasonable Maximum Exposure.
(a) - 1 day per week for 26 weeks (6 months) of the year.
(b) - 1 day per 2 weeks for 26 weeks (6 months) of the year.
(c) - Trespassing teenager is assumed to range in age from 7 to 18. Therefore, total exposure duration is 11 years.
(d) - USEPA, 1991b. Standard Default Exposure Factors.
(e) - USEPA, 1997a. Exposure Factors Handbook. Average soil ingestion rate for an adult listed in Table 1-2.
(f) - USEPA, 1997a. Exposure Factors Handbook. Average surface are of hands, forearms and lower legs of males and females aged 7 to 18.
(g) - USEPA, 1997a. Exposure Factors Handbook. See Table 5-13 for calculation.
(h) - USEPA, 1997a. Exposure Factors Handbook. Body weight is the average of males and females aged 7 to 18.
(i) - The trespassing teen is assumed to stay in the fill area for two hours.
(j) - USEPA, 1997a. Exposure Factors Handbook. Inhalation rates is the value for moderate activity (children) listed in Table 5-23.
(k) - USEPA, 1997a. Exposure Factors Handbook. Inhalation rates is the value for light activity (children) listed in Table 5-23.

1/2/01

TABLE 5-5
SUMMARY OF POTENTIAL EXPOSURE ASSUMPTIONS - CONSTRUCTION WORKER
SAUGET AREA 1 EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Parameter	RME Future Construction/Utility Worker		MLE Future Construction/Utility Worker	
Parameters Used in the Surface Soil and Subsurface Soil Inhalation Pathway				
Exposure Time (hr/day)	8	(a)	8	(a)
Exposure Frequency (days/year)	40	(b)	20	(c)
Exposure Duration (yr)	1	(d)	1	(d)
Inhalation Rate (m^3/hour)	2.5	(e)	1.5	(f)
Body Weight (kg)	70	(g)	70	(g)
Parameters Used in the Surface and Subsurface Soil Pathway				
Exposure Frequency (days/year)	40	(b)	20	(c)
Exposure Duration (yr)	1	(d)	1	(d)
Soil Ingestion Rate (mg/day)	100	(g)	64	(h)
Skin Contacting Medium (cm^2)	3339	(i)	3339	(i)
Soil on Skin (mg/cm^2)	0.19	(j)	0.19	(j)
Body Weight (kg)	70	(g)	70	(g)
Parameters Used in the Groundwater Pathway				
Exposure Time (hr/event)	1	(k)	1	(k)
Exposure Frequency (days/year)	10	(k)	5	(k)
Exposure Duration (yr)	1	(d)	1	(d)
Water Ingestion Rate (l/event)	0.005	(l)	0.005	(l)
Skin Contacting Medium (cm^2)	3339	(i)	3339	(i)
Body Weight (kg)	70	(g)	70	(g)
Parameters Used in the Groundwater Inhalation Pathway				
Exposure Time (hr/day)	8	(a)	8	(a)
Exposure Frequency (days/year)	40	(b)	20	(c)
Exposure Duration (yr)	1	(d)	1	(d)
Inhalation Rate (m^3/hour)	2.5	(e)	1.5	(f)
Body Weight (kg)	70	(g)	70	(g)

Notes:
MLE - Most Likely Exposure.
RME - Reasonable Maximum Exposure.
(a) - USEPA, 1997a. Exposure Factors Handbook. 50th percentile time spent at work, males and females, all ages. Table 15-68.
(b) - Exposure frequency is equivalent to 5 days per week for 2 months.
(c) - Exposure frequency is equivalent to five days per week for one month.
(d) - Construction activities are assumed to occur over a 1 year period.
(e) - USEPA, 1997a. Exposure Factors Handbook. Inhalation rate is the value for heavy activity for an outdoor worker listed in Table 5-23.
(f) - USEPA, 1997a. Exposure Factors Handbook. Inhalation rate is the value for moderate activity for an outdoor worker listed in Table 5-23.
(g) - USEPA, 1991b. Standard Default Exposure Factors.
(h) - ENSR-derived value; described briefly in the text.
(i) - USEPA, 1997a. Exposure Factors Handbook. Represents 50th percentile values for males and females based on hands, forearms, and face.
(j) - USEPA, 1997a. Exposure Factors Handbook. See Table 5-10 for calculation.
(k) - Assumed that contact with water occurs only for a fraction of the total exposure duration and time.
(l) - USEPA, 1989a. Risk Assessment Guidance for Superfund, Volume I. Value is one-tenth of that assumed to occur during a swimming event.

1/2/01

TABLE 5-6
SUMMARY OF POTENTIAL EXPOSURE ASSUMPTIONS - RESIDENT
SAUGET AREA 1 EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Parameter	RME Resident				MLE Resident			
	Adult		Child (0 to 6 yrs)		Adult		Child (0 to 6 yrs)	
Parameters Used in the Outdoor Air Inhalation Pathway								
Exposure Time (hr/day)	2	(a)	6	(a)	2	(a)	6	(a)
Exposure Frequency (days/year)	266	(c)	266	(c)	178	(e)	178	(e)
Exposure Duration (yr)	24	(b)	6	(b)	7	(f)	2	(f)
Inhalation Rate (m^3/hour)	1.6	(g)	1.2	(g)	0.55	(h)	0.32	(i)
Body Weight (kg)	70	(b)	15	(b)	70	(b)	15	(b)
Parameters Used in the Surface Soil Pathway								
Exposure Frequency (days/year)	266	(c)	266	(c)	178	(e)	178	(e)
Exposure Duration (yr)	24	(b)	6	(b)	7	(f)	2	(f)
Soil Ingestion Rate (mg/day)	100	(b)	200	(b)	50	(j)	100	(j)
Skin Contacting Medium (cm^2)	5729	(k)	2058	(k)	5729	(k)	2058	(k)
Soil on Skin (mg/cm^2)	0.12	(l)	0.06	(l)	0.12	(l)	0.06	(l)
Body Weight (kg)	70	(b)	15	(b)	70	(b)	15	(b)
Parameters Used in the Homegrown Produce Pathway								
Exposure Frequency (days/year)	365	(p)	365	(p)	365	(p)	365	(p)
Exposure Duration (yr)	24	(b)	6	(b)	7	(f)	2	(f)
Produce Ingestion Rate (g/day)	454	(m)	15	(m)	125	(n)	4	(n)
Body Weight (kg)	70	(b)	15	(b)	70	(b)	15	(b)
Parameters Used in the Indoor Air Inhalation Pathway								
Exposure Time (hr/day)	16.4	(o)	18	(o)	16.4	(o)	18	(o)
Exposure Frequency (days/year)	266	(c)	266	(c)	178	(e)	178	(e)
Exposure Duration (yr)	24	(b)	6	(b)	7	(f)	2	(f)
Inhalation Rate (m^3/hour)	1.6	(g)	1.2	(g)	0.55	(h)	0.32	(i)
Body Weight (kg)	70	(b)	15	(b)	70	(b)	15	(b)
Parameters Used in the Groundwater Pathway								
Exposure Time (hr/event)	1	(r)	1	(r)	1	(r)	1	(r)
Exposure Frequency (days/year)	26	(s)	26	(s)	13	(t)	13	(t)
Exposure Duration (yr)	24	(b)	6	(b)	7	(f)	2	(f)
Water Ingestion Rate (l/event)	0.005	(q)	0.005	(q)	0.001	(u)	0.001	(u)
Skin Contacting Medium (cm^2)	5729	(k)	2058	(k)	5729	(k)	2058	(k)
Body Weight (kg)	70	(b)	15	(b)	70	(b)	15	(b)

Notes:
MLE - Most Likely Exposure.
RME - Reasonable Maximum Exposure.
(a) - USEPA, 1997a. Exposure Factors Handbook. Values for time spent outdoors listed in Table 1-2 (average of weekends /weekdays for children).
(b) - USEPA, 1991b. Standard Default Exposure Factors.
(c) - Exposure frequency of 350 days (USEPA, 1991b) adjusted for percentage of days with inclement weather (24%), [350-(350*0.24) = 266]; See text.
(d) - USEPA, 1993b. Central tendency residential exposure frequency = 234 days.
(e) - Exposure frequency of 234 days (USEPA, 1993b) adjusted for percentage of days with inclement weather (24%), [234 - (234*0.24) = 178]; See text.
(f) - USEPA, 1997a. Exposure Factors Handbook. Recommended average for time residing in a household, Table 1-2. (9 years total, assuming 7 years as an adult and 2 as a child - assumes that the 2 years as a child can occur anywhere between the ages of 0 to 6. Therefore, exposure factors for a 0 to 6 year old child are employed).
(g) - USEPA, 1997a. Exposure Factors Handbook. Inhalation rates are the values for moderate activity listed in Table 5-23.
(h) - USEPA, 1997a. Exposure Factors Handbook. Average daily inhalation rate for men and women, Table 5-23.
(i) - USEPA, 1997a. Exposure Factors Handbook. Average of recommended inhalation rates for children age 0-6 years, Table 5-23.
(j) - USEPA, 1997a. Exposure Factors Handbook. Average soil ingestion rates listed in Table 1-2.
(k) - USEPA, 1997a. Exposure Factors Handbook. Represents average 50th percentile surface area for males and females of hands, forearms, lower legs, and feet.
(l) - USEPA, 1997a. Exposure Factors Handbook. See Tables 5-11 and 5-12 for calculation.
(m) - USEPA, 1997a. Exposure Factors Handbook. Based on recommended 95th percentile homegrown vegetable intake of 7.5 g/kg body weight-day, Table 1-2. Adjusted for cooking loss and dry weight.
(n) - USEPA, 1997a. Exposure Factors Handbook. Based on average homegrown vegetable intake of 2.1 g/kg body weight-day, Table 1-2. Adjusted for cooking loss and dry weight.
(o) - USEPA, 1997a. Exposure Factors Handbook. Values for time spent indoors listed in Table 1-2 (average of weekends /weekdays for children; assumes that adult spends time away from the household).
(p) - Produce ingestion rate is based on 365 days per year.
(q) - USEPA, 1989a. Risk Assessment Guidance for Superfund, Volume I. Value is one-tenth of that assumed to occur during a swimming event.
(r) - The adult and child are assumed to be in contact with groundwater outdoors for one hour per event.
(s) - Two days per week for three months.
(t) - One day per week for three months.
(u) - USEPA, 1989a. Risk Assessment Guidance for Superfund, Volume I. Value is one-fiftieth of that assumed to occur during a swimming event.

TABLE 5-7
SUMMARY OF POTENTIAL EXPOSURE ASSUMPTIONS - RECREATIONAL TEENAGER
SAUGET AREA 1 EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Parameter		RME Recreational Teenager (7 to 18 yrs)		MLE Recreational Teenager (7 to 18 yrs)	
Parameters Used in the Dead Creek Sediment Pathway - Wading					
	Exposure Frequency (days/year)	26	(a)	13	(b)
	Exposure Duration (yr)	11	(c)	11	(c)
	Soil Ingestion Rate (mg/day)	100	(d)	50	(e)
	Skin Contacting Medium (cm^2)	2029	(f)	2029	(f)
	Sediment on Skin (mg/cm^2)	1	(g)	1	(g)
	Body Weight (kg)	47	(h)	47	(h)
Parameters Used in the Dead Creek Surface Water Pathway - Wading					
	Exposure Frequency (days/year)	26	(a)	13	(b)
	Exposure Duration (yr)	11	(c)	11	(c)
	Surface Water Ingestion Rate (l/event)	0.01	(i)	0.005	(j)
	Skin Contacting Medium (cm^2)	2029	(f)	2029	(f)
	Body Weight (kg)	47	(h)	47	(h)
Paramaters Used in the Borrow Pit Lake Sediment Pathway - Swimming					
	Exposure Frequency (days/year)	12	(k)	6	(l)
	Exposure Duration (yr)	11	(c)	11	(c)
	Soil Ingestion Rate (mg/day)	100	(d)	50	(e)
	Skin Contacting Medium (cm^2)	2029	(f)	2029	(f)
	Sediment on Skin (mg/cm^2)	1	(g)	1	(g)
	Body Weight (kg)	47	(h)	47	(h)
Parameters Used in the Borrow Pit Lake Surface Water Pathway - Swimming					
	Exposure Frequency (days/year)	12	(k)	6	(l)
	Exposure Duration (yr)	11	(c)	11	(c)
	Surface Water Ingestion Rate (l/event)	0.05	(m)	0.01	(i)
	Skin Contacting Medium (cm^2)	13533	(n)	13533	(n)
	Body Weight (kg)	47	(h)	47	(h)

Notes:
MLE - Most Likely Exposure.
RME - Reasonable Maximum Exposure.
(a) - 1 day per week for 26 weeks (6 months) of the year.
(b) - 1 day per 2 weeks for 26 weeks (6 months) of the year.
(c) - Recreational teenager is assumed to range in age from 7 to 18. Therefore, total exposure duration is 11 years.
(d) - USEPA, 1991b. Standard Default Exposure Factors.
(e) - USEPA, 1997a. *Exposure Factors Handbook. Average soil ingestion rate for an adult listed in Table 1-2.*
(f) - USEPA, 1997a. Exposure Factors Handbook. Average surface are of feet and 1/4 the legs of males and females aged 7-18.
(g) - USEPA, 1992b. Dermal Exposure Assessment: Principles and Applications.
(h) - USEPA, 1997a. Exposure Factors Handbook. Body weight is the average of males and females aged 7-18.
(i) - USEPA, 1989a. Risk Assessment Guidance for Superfund, Volume I. Value is one-fifth of that assumed to occur during a swimming event.
(j) - USEPA, 1989a. Risk Assessment Guidance for Superfund, Volume I. Value is one-tenth of that assumed to occur during a swimming event.
(k) - Two events per month for the 6 warmest months of the year.
(l) - One events per month for the 6 warmest months of the year.
(m) - USEPA, 1989a. Risk Assessment Guidance for Superfund, Volume I. Value for a swimming event.
(n) - Value represents average total body surface area of males and females aged 7 to 18. Assumed 100% of skin surface exposed while swimming.

1/2/01

TABLE 5-8
SUMMARY OF POTENTIAL EXPOSURE ASSUMPTIONS - RECREATIONAL FISHER
SAUGET AREA 1 EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Parameter	RME Adult Recreational Fisher		MLE Adult Recreational Fisher	
Parameters Used in the Fish Ingestion Pathway				
Exposure Frequency (days/year)	365	(a)	365	(a)
Exposure Duration (yr)	30	(b)	9	(c)
Fish Ingestion Rate (g/day)	8	(d)	1	(e)
Body Weight (kg)	70	(b)	70	(b)
Parameters Used in the Surface Water Pathway - Wading				
Exposure Frequency (days/year)	22	(k)	3	(l)
Exposure Duration (yr)	30	(b)	9	(c)
Surface Water Ingestion Rate (l/event)	0.01	(f)	0.005	(m)
Skin Contacting Medium (cm^2)	4500	(g)	4500	(g)
Body Weight (kg)	70	(b)	70	(b)
Paramaters Used in the Sediment Pathway - Wading				
Exposure Frequency (days/year)	22	(k)	3	(l)
Exposure Duration (yr)	30	(b)	9	(c)
Sediment Ingestion Rate (mg/day)	100	(h)	50	(i)
Skin Contacting Medium (cm^2)	4500	(g)	4500	(g)
Sediment on Skin (mg/cm^2)	1	(j)	1	(j)
Body Weight (kg)	70	(b)	70	(b)

Notes:
MLE - Most Likely Exposure.
RME - Reasonable Maximum Exposure.
(a) - Fish ingestion rates are based on 365 days per year.
(b) - USEPA, 1991b. Standard Default Exposure Factors.
(c) - USEPA, 1997a. Exposure Factors Handbook. Recommended average for time residing in a household. Table 1-2.
(d) - USEPA, 1997a. Exposure Factors Handbook. 8 g/day is equivalent to approximately 22 fish meals of 129 g per year.
(e) - 1 g/day is equivalent to approximately three 129 g fish meals per year (equivalent to one fish meal per month in the three summer months).
(f) - USEPA, 1989a. Risk Assessment Guidance for Superfund, Volume I. Value is one-fifth of that assumed to occur during a swimming event.
(g) - USEPA, 1997a. Exposure Factors Handbook. Represents 50th percentile values for males and females based on hands, lower legs, and feet.
(h) - USEPA, 1991b. Standard Default Exposure Factors.
(i) - USEPA, 1997a. Exposure Factors Handbook. Average soil ingestion rates listed in Table 1-2.
(j) - USEPA, 1992b. Dermal Exposure Assessment: Principles and Applications.
(k) - One day per month for 5 months.
(l) - One day per month during the three summer months.
(m) - USEPA, 1989a. Risk Assessment Guidance for Superfund, Volume I. Value is one-tenth of that assumed to occur during a swimming event.

1/2/01

TABLE 5-9
SOIL ADHERENCE FACTORS- OUTDOOR INDUSTRIAL WORKER
SAUGET AREA 1 EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Body Part	Outdoor Industrial Worker Scenario		
	Surface Area 50th percentile (cm^2) (a)	Soil Loading Groundskeeper (mg/cm^2) (b)	Total Soil Mass (mg)
Head	1,205	0.005	5.543
Hands	904	0.071	64.1485
Forearms	1,230	0.009	11.1438
Total	3,339		80.8
Area-Weighted Soil Adherence factor (mg/cm2) = Soil mass/Surface area =			0.02

Notes:
(a) - Data from USEPA (1997a). Tables 6-2, 6-3. Average of 50th percentile values for men and women (1/2 arm used as proxy for female forearm).
(b) - Data from USEPA (1997a), Table 6-12. Average of Groundskeeper Nos. 1,2,3,4, and 5.

TABLE 5-10
SOIL ADHERENCE FACTORS- CONSTRUCTION WORKER
SAUGET AREA 1 EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Body Part	Construction Worker Scenario		
	Surface Area 50th percentile (cm^2) (a)	Soil Loading Farmer (mg/cm^2) (a)	Total Soil Mass (mg)
Head	1,205	0.041	49.405
Hands	904	0.47	424.645
Forearms	1,230	0.13	159.9
Total	3,339		634.0
Area-Weighted Soil Adherence factor (mg/cm2) = Soil mass/Surface area =			0.19

Notes:
(a) - Data from USEPA (1997a). Tables 6-2, 6-3. Average of 50th percentile values for men and women (1/2 arm used as proxy for female forearm).
(b) - Data from USEPA (1997a), Table 6-12. Average of Farmer Nos. 1 and 2.

TABLE 5-11
SOIL ADHERENCE FACTORS- RESIDENT ADULT
SAUGET AREA 1 EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Body Part	Adult Resident Surface Area 50th percentile (a) (cm^2)	Soil Loading Gardeners (mg/cm^2) (b)	Total Soil Mass (mg)
Hands	904	0.19	171.67
Forearms	1,230	0.052	63.96
Lower legs	2,370	0.047	111.39
Feet	1,225	0.215	347.02
Total	5,729	--	694.03
Area-Weighted Soil Adherence factor (mg/cm2) = Soil mass/Surface area =			0.12

Notes:
(a) - Data from USEPA (1997a). Tables 6-2, 6-3. Average of 50th percentile values for men and women (1/2 arm used as proxy for female forearm).
(b) - Data from USEPA (1997a) Table 6-12. Average of gardeners Nos. 1 and 2.

TABLE 5-12
SOIL ADHERENCE FACTORS- RESIDENT CHILD
SAUGET AREA 1 EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Body Part	Child Resident (0 to 6 years old) Surface Area 50th percentile (a) (cm^2)	Soil Loading Day Care Kids (mg/cm^2) (b)	Total Soil Mass (mg)
Hands	358	0.0923	33.04
Forearms	437	0.0230	10.05
Lower legs	812	0.0195	15.83
Feet	451	0.0646	58.93
Total	2,058	--	117.86
Area-Weighted Soil Adherence factor (mg/cm2) = Soil mass/Surface area =			0.06

Notes:
(a) - Data from USEPA (1997a). Based on average of boys (Table 6-6) and girls (Table 6-7) total body surface area (6,557 cm2), and mean percentages of total surface area for individual body parts Table 6-8).
(b) - Data from USEPA (1997a), Table 6-12, Daycare kids Nos. #1a, #1b ,#2c, #3.

TABLE 5-13
SOIL ADHERENCE FACTORS- TRESPASSING TEENAGER (7 TO 18)
SAUGET AREA 1 EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Trespassing Teenager (7 to 18)		
Body Part	**Surface Area 50th percentile (a) (cm^2)**	**Soil Loading Soccer Kids (mg/cm^2) (b)**	**Total Soil Mass (mg)**
Hands	715	0.0547	39.09
Forearms	894	0.0061	5.42
Lower legs	2,068	0.0177	36.60
Total	3,677	--	
Area-Weighted Soil Adherence factor (mg/cm2) = Soil mass/Surface area =			0.02

Notes:
(a) - Data from USEPA (1997a). Based on average of boys (Table 6-6) and girls (Table 6-7) total body surface area , and mean percentages of total surface area for individual body parts Table 6-8).
(b) - Data from USEPA (1997a) Table 6-12. Average of Soccer Kids Nos. 1, 2, and 3.

TABLE 5-14
EXPOSURE POINT CONCENTRATIONS (RME) - TRANSECT SOILS
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

		Residential Scenario EPCs					Industrial Scenario EPCs					
		Surface Soil (mg/kg)					Surface Soil (mg/kg)				Subsurface Soil (mg/kg)	
Constituent	**CAS**	**T3**	**T4**	**T5**	**T6**	**T7**	**T3**	**T4**	**T6**	**T7**	**T4**	**T6**
Arsenic	7440-38-2	--	--	--	--	14.98	--	--	--	14.98	--	--
Benzo(a)anthracene	56-55-3	--	4.30	--	4.20	1.90	--	--	--	--	5.90	--
Benzo(a)pyrene	50-32-8	0.26	3.50	0.34	3.60	2.10	0.26	3.50	3.60	2.10	1.92	0.75
Benzo(b)fluoranthene	205-99-2	0.40	2.81	--	4.40	2.20	--	--	--	--	3.30	--
Dibenzo(a,h)anthracene	53-70-3	0.10	0.23	0.19	0.33	0.20	--	0.23	--	--	0.52	--
Dieldrin	60-57-1	--	--	0.10	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	193-39-5	--	0.96	--	0.59	0.63	--	--	--	--	--	--

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
RME - Reasonable Maximum Exposure.
T - Transect.

TABLE 5-15
EXPOSURE POINT CONCENTRATIONS (RME) - SITE SOILS
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	CAS Number	Residential Scenario EPCs Site (mg/kg)	Industrial Scenario EPCs Site (mg/kg)		
		N	H	I	L
Arsenic	7440-38-2	--	64	--	37
Benzo(a)pyrene	50-32-8	0.33	--	2.2	7
Copper	7440-50-8	--	--	13000	--
Dibenzo(a,h)anthracene	53-70-3	0.11	--	--	1.3
Total 2,3,7,8-TCDD TEQ	1746-01-6	--	0.0013	0.012	--
Total PCBs	1336-36-3	--	1.52	121.3	1.07

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
RME - Reasonable Maximum Exposure.

TABLE 5-16
EXPOSURE POINT CONCENTRATIONS (RME) - TRANSECT SOILS - OUTDOOR AIR PARTICULATES
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSEMENT

		Residential Scenario EPCs for Air					Industrial Scenario EPCs for Air			
		Particulates from Surface Soil (mg/m3) (a)					Particulates from Surface Soil (mg/m3) (a)			
Constituent	**CAS**	**T3**	**T4**	**T5**	**T6**	**T7**	**T3**	**T4**	**T6**	**T7**
Arsenic	7440-38-2	--	--	--	--	1.27E-08	--	--	--	1.27E-08
Benzo(a)anthracene	56-55-3	--	3.63E-09	--	3.55E-09	1.61E-09	--	--	--	--
Benzo(a)pyrene	50-32-8	2.20E-10	2.96E-09	2.87E-10	3.04E-09	1.77E-09	2.20E-10	2.96E-09	3.04E-09	1.77E-09
Benzo(b)fluoranthene	205-99-2	3.38E-10	2.37E-09	--	3.72E-09	1.86E-09	--	--	--	--
Dibenzo(a,h)anthracene	53-70-3	8.45E-11	1.94E-10	1.61E-10	2.79E-10	1.69E-10	--	1.94E-10	--	--
Dieldrin	60-57-1	--	--	8.45E-11	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	193-39-5	--	8.07E-10	--	4.99E-10	5.32E-10	--	--	--	--

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
RME - Reasonable Maximum Exposure.
T - Transect.
(a) - Concentration in outdoor air is equal to the concentration in soil (mg/kg) divided by the particulate emission factor (1.18E+09 m^3/kg) calculated for the transects in Table 5-18.

TABLE 5-17
EXPOSURE POINT CONCENTRATIONS (RME)- SITE SOILS - OUTDOOR AIR PARTICULATES
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	CAS Number	Residential Scenario EPCs for Air Site (mg/m3)	Industrial Scenario EPCs for Air Site (mg/m3)		
		N (a)	H (a)	I (a)	L (a)
Arsenic	7440-38-2	--	8.11E-08	--	3.13E-08
Benzo(a)pyrene	50-32-8	4.18E-10	--	3.64E-09	5.91E-09
Copper	7440-50-8	--	--	2.15E-05	--
Dibenzo(a,h)anthracene	53-70-3	1.39E-10	--	--	1.10E-09
Total 2,3,7,8-TCDD TEQ	1746-01-6	--	1.65E-12	1.99E-11	--
Total PCBs	1336-36-3	--	1.93E-09	2.01E-07	9.04E-10
Particulate Emission Factor (m^3/kg) (b)		7.90E+08	7.90E+08	6.04E+08	1.18E+09

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
RME - Reasonable Maximum Exposure.
(a) - Concentration in outdoor air is equal to the concentration in soil (mg/kg) divided by the particulate emission factor.
(b) - Particulate emission factor is calculated for each site in Tables 5-18, 5-19, and 5-20.

TABLE 5-18
CALCULATION OF PARTICULATE EMISSION FACTOR FOR TRANSECTS AND SITE L
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Parameter	Definition	Units	Value	Source
Q/C	Inverse of mean concentration at center of source	g/m^2-s per kg/m^3	81.64	(a)
V	Fraction of vegetative cover	unitless	0.5	(b)
U_m	Mean annual windspeed	m/s	4.69	(b)
U_t	Equivalent threshold value of windspeed at 7 m	m/s	11.32	(b)
F(x)	Function dependent on U_m/U_t	unitless	0.194	(b)
PEF	Particulate emmission factor	m^3/kg	1.18E+09	(c)

Notes:
(a) - USEPA, 1996a. Soil Screening Guidance: User's Guide. Exhibit 11.
Value for Lincoln, Nebraska, 0.5 acre source area.
(b) - USEPA, 1996a. Soil Screening Guidance: User's Guide. Default value. Equation 5.
(c) -USEPA, 1996a. Soil Screening Guidance: User's Guide. Calculated using above parameters and Equation 5:

$$PEF\ (m^3/kg) = Q/C\ (g/m^2\text{-s per } kg/m^3) \times \frac{3600 s/h}{0.036 \times (1-V) \times (Um/Ut)^3 \times F(x)}$$

TABLE 5-19
CALCULATION OF PARTICULATE EMISSION FACTOR FOR SITES H AND N
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Parameter	Definition	Units	Value	Source
Q/C	Inverse of mean concentration at center of source	g/m^2-s per kg/m^3	54.47	(a)
V	Fraction of vegetative cover	unitless	0.5	(b)
U_m	Mean annual windspeed	m/s	4.69	(b)
U_t	Equivalent threshold value of windspeed at 7 m	m/s	11.32	(b)
F(x)	Function dependent on U_m/U_t	unitless	0.194	(b)
PEF	Particulate emmission factor	m^3/kg	7.90E+08	(c)

Notes:
(a) - USEPA, 1996a. Soil Screening Guidance: User's Guide. Exhibit 11.
Value for Lincoln, Nebraska, 5 acre source area.
(b) - USEPA, 1996a. Soil Screening Guidance: User's Guide. Default value. Equation 5.
(c) -USEPA, 1996a. Soil Screening Guidance: User's Guide. Calculated using above parameters and Equation 5:

$$\text{PEF (m^3/kg)} = \text{Q/C (g/m^2-s per kg/m^3)} \times \frac{3600\text{s/h}}{0.036 \times (1-V) \times (Um/Ut)^3 \times F(x)}$$

TABLE 5-20
CALCULATION OF PARTICULATE EMISSION FACTOR FOR SITE I
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Parameter	Definition	Units	Value	Source
Q/C	Inverse of mean concentration at center of source	g/m^2-s per kg/m^3	41.65	(a)
V	Fraction of vegetative cover	unitless	0.5	(b)
U_m	Mean annual windspeed	m/s	4.69	(b)
U_t	Equivalent threshold value of windspeed at 7 m	m/s	11.32	(b)
F(x)	Function dependent on U_m/U_t	unitless	0.194	(b)
PEF	Particulate emmission factor	m^3/kg	6.04E+08	(c)

Notes:
(a) - USEPA, 1996a. Soil Screening Guidance: User's Guide. Exhibit 11.
Value for Lincoln, Nebraska, 30 acre source area.
(b) - USEPA, 1996a. Soil Screening Guidance: User's Guide. Default value. Equation 5.
(c) -USEPA, 1996a. Soil Screening Guidance: User's Guide. Calculated using above parameters and Equation 5:

$$PEF\ (m^3/kg) = Q/C\ (g/m^2\text{-s per }kg/m^3) \times \frac{3600 s/h}{0.036 \times (1-V) \times (Um/Ut)^3 \times F(x)}$$

TABLE 5-21
EXPOSURE POINT CONCENTRATIONS (RME) - TRANSECT AREA SOILS - OUTDOOR EXCAVATION AIR
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

		Construction Scenario EPCs for Air (a)					
		Surface Soil (mg/m3)				Subsurface Soil (mg/m3)	
Constituent	CAS	T3	T4	T6	T7	T4	T6
Arsenic	7440-38-2	--	--	--	8.99E-07	--	--
Benzo(a)anthracene	56-55-3	--	--	--	--	3.54E-07	--
Benzo(a)pyrene	50-32-8	1.56E-08	2.10E-07	2.16E-07	1.26E-07	1.15E-07	4.50E-08
Benzo(b)fluoranthene	205-99-2	--	--	--	--	1.98E-07	--
Dibenzo(a,h)anthracene	53-70-3	--	1.38E-08	--	--	3.12E-08	--
Dieldrin	60-57-1	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	193-39-5	--	--	--	--	--	--

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
RME - Reasonable Maximum Exposure.
T - Transect.
(a) - Excavation air concentrations are the soil concentration (mg/kg) multiplied by the PM10 (Particulate Matter of 10 microns in diameter) dust concentration (0.06 mg/m3) (MADEP, 1995) multiplied by a unit correction factor (1E-6 kg/mg).

TABLE 5-22
EXPOSURE POINT CONCENTRATIONS (RME) - SITE SOILS - OUTDOOR EXCAVATION AIR
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Construction Scenario EPCs for Air Site (mg/m3) (a)		
	H	I	L
Arsenic	3.84E-06	--	2.22E-06
Benzo(a)pyrene	--	1.32E-07	4.20E-07
Copper	--	7.80E-04	--
Dibenzo(a,h)anthracene	--	--	7.80E-08
Total 2,3,7,8-TCDD TEQ	7.80E-11	7.20E-10	--
Total PCBs	9.12E-08	7.28E-06	6.42E-08

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
RME - Reasonable Maximum Exposure.
(a) - Excavation air concentrations are the soil concentration (mg/kg) multiplied by the PM10 (Particulate Matter of 10 microns in diameter) dust concentration (0.06 mg/m3) (MADEP, 1995) multiplied by a unit correction factor (1E-6 kg/mg).

TABLE 5-23
EXPOSURE POINT CONCENTRATIONS (RME) - SEDIMENT AND FISH FILLET
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

		Dead Creek and Borrow Pit Lake	
Constituent	**CAS**	**EPC Sediment (mg/kg)**	**EPC Fish Fillet (mg/kg)**
Arsenic	7440-38-2	17.93	0.45
Total PCBs	1336-36-3	1.24	--

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
RME - Reasonable Maximum Exposure.

TABLE 5-24
EXPOSURE POINT CONCENTRATIONS (RME) - GROUNDWATER
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Site Location	CAS	Groundwater EPCs (mg/L)													
		Site G			Site H			Site I						Site L	RES
Constituent	Number	EE-05	EEG-106	EEG-107	EE-01	EE-02	EE-03	AA-I-S1	AA-I-S2	EE-12	EE-13	EE-14	EE-15	EEG-109	DW-MCDO
1,1,2,2-Tetrachloroethane	79-34-5	--	--	--	1.20E-02	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	--	--	8.50E-01	2.20E+00	6.35E-01	--	4.40E+00	4.20E+00	--	--	1.40E+01	4.30E-01	--	--
2,4,5-TP (Silvex)	93-72-1	3.90E-01	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	--	--	--	2.70E-01	4.65E-01	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	--	--	3.60E+00	--	3.70E-01	--	--	--	--	--	--	--	2.60E-02	--
2-Chlorophenol	95-57-8	--	--	6.30E-01	--	--	--	--	--	--	--	--	--	--	--
2-Nitroaniline	88-74-4	--	--	--	--	1.35E-02	--	--	--	--	--	--	--	--	--
3-Methylphenol/4-Methylphenol	(a)	--	--	2.40E+00	--	--	--	--	--	--	--	--	--	--	--
4,4-DDE	72-55-9	--	--	--	--	--	--	--	--	2.20E-03	--	--	--	--	--
4-Chloroaniline	106-47-8	1.60E+00	--	2.30E+01	1.80E+00	7.75E-01	--	4.10E+00	6.80E-01	1.40E+00	--	1.80E+00	--	5.50E-02	--
4-Methyl-2-pentanone	108-10-1	--	--	1.30E+00	--	--	--	--	--	--	--	--	--	--	--
4-Nitroaniline	100-01-6	8.40E-03	--	--	--	--	--	--	--	--	--	--	--	--	--
alpha-BHC	319-84-6	--	8.30E-03	6.00E-03	--	4.95E-04	--	--	--	2.45E-03	--	1.10E-03	--	--	--
Antimony	7440-36-0	--	--	--	--	1.05E-01	--	--	--	--	--	--	--	--	--
Arsenic	7440-38-2	--	--	--	--	1.25E+00	--	--	--	--	--	--	--	4.30E+00	--
Benzene	71-43-2	1.10E-01	--	3.70E+00	1.50E+00	2.25E+00	--	6.20E-01	1.20E-01	6.80E-01	--	7.50E-01	--	4.40E-02	--
Benzo(k)fluoranthene	207-08-9	--	--	--	--	--	--	--	1.20E-03	--	--	--	--	--	--
beta-BHC	319-85-7	--	3.60E-04	--	--	--	--	--	--	--	--	1.00E-03	--	--	--
Cadmium	7440-43-9	--	--	--	--	--	--	--	7.00E-02	--	--	--	--	--	--
Carbazole	86-74-8	--	--	--	5.20E-03	--	--	--	--	3.50E-03	--	2.60E-02	--	--	--
Chlorobenzene	108-90-7	6.20E-01	--	4.30E+00	1.20E+00	4.35E+00	--	8.70E+00	3.20E+00	1.40E+00	--	3.80E+00	--	--	--
Chloroform	67-66-3	--	--	--	--	4.25E-01	--	--	--	--	--	--	--	7.60E-02	--
Cis/Trans-1,2-Dichloroethene	107-06-2	--	--	--	--	--	--	1.20E+00	5.10E-01	--	--	--	--	--	--
delta-BHC	319-86-8	3.60E-04	--	1.70E-02	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	--	--	--	1.80E+00	--	--	--	--	--	--	--	--	--	--
Heptachlor	76-44-8	--	--	--	--	--	--	--	--	2.50E-03	--	--	--	--	--
Heptachlor epoxide	1024-57-3	--	--	--	--	4.40E-03	--	--	--	5.60E-03	--	--	--	--	--
Lead	7439-92-1	--	--	--	--	--	--	--	--	--	--	--	--	--	1.29E-01
Molybdenum	7439-98-7	4.50E-01	--	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	3.90E-01	--	2.10E+00	2.30E+00	1.95E-01	--	--	--	--	--	--	--	--	--
Nickel	7440-02-0	--	--	--	--	--	--	--	7.80E+00	--	--	--	--	1.80E+02	--
Nitrobenzene	98-95-3	--	--	--	--	5.65E-02	--	--	--	--	--	--	--	--	--
Pentachlorophenol	87-86-5	--	--	2.00E+00	4.30E+00	6.70E-01	--	--	--	--	--	5.00E-01	--	--	--
Phenol	108-95-2	3.80E-01	--	1.40E+01	--	3.15E-01	--	--	--	--	--	--	--	--	--
Tetrachloroethene	127-18-4	--	--	1.70E-01	--	--	--	--	--	--	--	--	--	--	--
Toluene	108-88-3	--	--	8.50E+00	--	--	--	--	--	--	--	--	--	--	--
Total 2,3,7,8-TCDD TEQ	1746-01-6	1.78E-07	--	3.60E-06	4.57E-08	--	5.02E-08	--	--	3.05E-06	4.74E-08	7.69E-07	--	--	--
Total PCBs	1336-36-3	--	--	--	--	--	--	--	--	--	--	5.88E-03	--	--	--
Trichloroethene	79-01-6	--	--	2.00E-01	--	4.95E-02	--	--	1.80E-01	--	--	--	--	--	--
Vanadium	7440-62-2	--	--	3.30E-01	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride	75-01-4	--	--	4.10E-02	--	--	--	9.70E-01	2.40E-01	--	--	--	--	--	--
Zinc	7440-66-6	--	--	--	--	--	--	--	3.30E+01	--	--	--	--	--	--

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
RES - Residential non-potable use well.
RME - Reasonable Maximum Exposure.

TABLE 5-25
EXPOSURE POINT CONCENTRATIONS (RME) - INDOOR AIR VOCs
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Site Constituent Location	CAS Number	Site Indoor Air VOC EPCs (mg/m3) (a)								
		G		H		I				L
		EE-05	EEG-107	EE-01	EE-02	AA-I-S1	AA-I-S2	EE-12	EE-14	EEG-109
1,1,2,2-Tetrachloroethane	79-34-5	--	--	5.79E-07	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	--	4.20E-04	--	--	--	--	--	--	--
Benzene	71-43-2	5.74E-05	1.98E-03	8.23E-04	1.23E-03	3.29E-04	6.37E-05	3.61E-04	3.98E-04	2.38E-05
Chlorobenzene	108-90-7	1.89E-04	1.35E-03	3.89E-04	1.41E-03	2.71E-03	9.96E-04	4.36E-04	1.18E-03	--
Chloroform	67-66-3	--	--	--	1.89E-04	--	--	--	--	3.34E-05
Ethylbenzene	100-41-4	--	--	9.90E-04	--	--	--	--	--	--
Naphthalene	91-20-3	1.79E-05	1.01E-04	1.16E-04	9.83E-06	--	--	--	--	--
Tetrachloroethene	127-18-4	--	1.89E-04	--	--	--	--	--	--	--
Toluene	108-88-3	--	4.70E-03	--	--	--	--	--	--	--
Trichloroethene	79-01-6	--	1.58E-04	--	4.01E-05	--	1.41E-04	--	--	--
Vinyl chloride	75-01-4	--	1.17E-04	--	--	2.76E-03	6.83E-04	--	--	--

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
RME - Reasonable Maximum Exposure.
VOCs - Volatile Organic Compounds.
(a) Calculated from Location groundwater concentration in Appendix K.

TABLE 5-26
EXPOSURE POINT CONCENTRATIONS (RME) - EXCAVATION AIR, VOLATILIZATION FROM EXPOSED GROUNDWATER
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Site	CAS	Site Excavation Air EPCs (mg/m3) (a)								
		G		H		I				L
Constituent Location	Number	EE-05	EEG-107	EE-01	EE-02	AA-I-S1	AA-I-S2	EE-12	EE-14	EEG-109
1,1,2,2-Tetrachloroethane	79-34-5	--	--	2.80E-04	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	--	1.25E-01	--	--	--	--	--	--	--
Benzene	71-43-2	2.98E-03	1.00E-01	4.06E-02	6.09E-02	1.68E-02	3.25E-03	1.84E-02	2.03E-02	1.19E-03
Chlorobenzene	108-90-7	1.55E-02	1.07E-01	3.00E-02	1.09E-01	2.17E-01	7.99E-02	3.50E-02	9.49E-02	--
Chloroform	67-66-3	--	--	--	1.16E-02	--	--	--	--	2.08E-03
Ethylbenzene	100-41-4	--	--	4.19E-02	--	--	--	--	--	--
Naphthalene	91-20-3	8.51E-03	4.58E-02	5.02E-02	4.26E-03	--	--	--	--	--
Tetrachloroethene	127-18-4	--	4.10E-03	--	--	--	--	--	--	--
Toluene	108-88-3	--	2.24E-01	--	--	--	--	--	--	--
Trichloroethene	79-01-6	--	2.62E-02	--	6.48E-03	--	2.35E-02	--	--	--
Vinyl chloride	75-01-4	--	1.30E-03	--	--	3.07E-02	7.59E-03	--	--	--

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
RME - Reasonable Maximum Exposure.
(a) Excavation air concentration (mg/m3) = groundwater concentration (mg/l) * groundwater-to-air attenuation factor (l/m^3) calculated in Appendix L.

TABLE 5-27
EXPOSURE POINT CONCENTRATIONS (RME) - OUTDOOR AIR VOCs
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Site Location / Constituent	CAS Number	Site Outdoor Air VOC EPCs (mg/m3)								
		G		H		I				L
		EE-05	EEG-107	EE-01	EE-02	AA-I-S1	AA-I-S2	EE-12	EE-14	EEG-109
1,1,2,2-Tetrachloroethane	79-34-5	--	--	2.50E-07	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	--	9.50E-06	--	--	--	--	--	--	--
Benzene	71-43-2	3.80E-06	1.40E-04	9.10E-05	1.40E-04	9.60E-05	1.90E-05	1.10E-04	1.20E-04	1.00E-06
Chlorobenzene	108-90-7	1.30E-05	9.50E-05	4.40E-05	1.60E-04	8.10E-04	3.00E-04	1.30E-04	3.50E-04	--
Chloroform	67-66-3	--	--	--	2.50E-05	--	--	--	--	1.40E-06
Ethylbenzene	100-41-4	--	--	1.20E-04	--	--	--	--	--	--
Naphthalene	91-20-3	1.20E-06	6.90E-06	1.30E-05	1.10E-06	--	--	--	--	--
Tetrachloroethene	127-18-4	--	1.50E-05	--	--	--	--	--	--	--
Toluene	108-88-3	--	3.40E-04	--	--	--	--	--	--	--
Trichloroethene	79-01-6	--	1.70E-05	--	7.00E-06	--	6.40E-05	--	--	--
Vinyl chloride	75-01-4	--	2.30E-05	--	--	2.30E-03	5.70E-04	--	--	--

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
RME - Reasonable Maximum Exposure.
VOCs - Volatile Organic Compounds.
(a) Calculated from Location groundwater concentration, as shown in Appendix M.

TABLE 5-28
EXPOSURE POINT CONCENTRATIONS (RME) - PRODUCE GROWN IN TRANSECT SOILS
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	CAS Number	Constituent Specific Inputs for Prediction of Produce Concentrations (a)			Transect 7 Predicted Produce Concentrations	
		Log Kow	Br_{ag}	$Br_{rootveg}$	Above Ground (mg/kg FW)	Below Ground (mg/kg FW)
Arsenic	7440-38-2	NA	6.33E-03	8.00E-03	1.42E-02	1.80E-02

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
FW - Fresh Weight
NA - Not Applicable.
RME - Reasonable Maximum Exposure.
(a) USEPA, 1998d. Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities. Volume Two. Appendix A. United States Environmental Protection Agency. Solid Waste and Emergency Response. EPA530-D-98-001B. July 1998. Calculations discussed in Appendix N.
(b) USEPA, 1998. Methodology for Assessing Health Risks Associated with Multiple Pathways of Exposure to Combustor Emissions. USEPA National Center for Environmental Assessment. EPA600/R-98/137.
Above Ground Produce Concentration = C_s x Br_{ag} x 0.15, where vegetable moisture content is assumed to be an average 85% (b).
Below Ground Produce Concentration = C_s x $Br_{rootveg}$ x 0.15, where vegetable moisture content is assumed to be an average 85% (b).
C_s = Concentration of constituent in soil.
Br_{ag} = Plant-soil bioconcentration factor for above ground produce.
$Br_{rootveg}$ = Plant-soil bioconcentration factor for below ground produce.

TABLE 5-29
EXPOSURE POINT CONCENTRATIONS (MLE) - TRANSECT SOILS
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	CAS	Residential Scenario EPCs Surface Soil (mg/kg)					Industrial Scenario EPCs Surface Soil (mg/kg)				Industrial Scenario EPCs Subsurface Soil (mg/kg)	
		T3	T4	T5	T6	T7	T3	T4	T6	T7	T4	T6
Arsenic	7440-38-2	--	--	--	--	9.99	--	--	--	9.99	--	--
Benzo(a)anthracene	56-55-3	--	0.70	--	0.61	0.34	--	--	--	--	1.28	--
Benzo(a)pyrene	50-32-8	0.14	0.59	0.14	0.50	0.37	0.14	0.59	0.50	0.37	0.61	0.19
Benzo(b)fluoranthene	205-99-2	0.16	0.60	--	0.63	0.41	--	--	--	--	1.07	--
Dibenzo(a,h)anthracene	53-70-3	0.07	0.13	0.10	0.12	0.10	--	0.13	--	--	0.24	--
Dieldrin	60-57-1	--	--	0.02	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	193-39-5	--	0.36	--	0.22	0.24	--	--	--	--	--	--

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
MLE - Most Likely Exposure.
T - Transect.

TABLE 5-30
EXPOSURE POINT CONCENTRATIONS (MLE) - SITE SOILS
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	CAS Number	Residential Scenario EPCs Site (mg/kg)	Industrial Scenario EPCs Site (mg/kg)		
		N	H	I	L
Arsenic	7440-38-2	--	23	--	33
Benzo(a)pyrene	50-32-8	0.19	--	0.63	2.3
Copper	7440-50-8	--	--	6660	--
Dibenzo(a,h)anthracene	53-70-3	0.07	--	--	0.5
Total 2,3,7,8-TCDD TEQ	1746-01-6	--	0.0005	0.003	--
Total PCBs	1336-36-3	--	0.66	31.3	0.49

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
MLE - Most Likely Exposure.

TABLE 5-31
EXPOSURE POINT CONCENTRATIONS (MLE) - TRANSECT SOILS - OUTDOOR AIR PARTICULATES
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSEMENT

Constituent	CAS	Residential Scenario EPCs for Air Surface Soil (mg/m3) (a)					Industrial Scenario EPCs for Air Surface Soil (mg/m3) (a)			
		T3	T4	T5	T6	T7	T3	T4	T6	T7
Arsenic	7440-38-2	--	--	--	--	8.44E-09	--	--	--	8.44E-09
Benzo(a)anthracene	56-55-3	--	5.91E-10	--	5.12E-10	2.89E-10	--	--	--	--
Benzo(a)pyrene	50-32-8	1.16E-10	4.99E-10	1.17E-10	4.26E-10	3.16E-10	1.16E-10	4.99E-10	4.26E-10	3.16E-10
Benzo(b)fluoranthene	205-99-2	1.35E-10	5.07E-10	--	5.36E-10	3.43E-10	--	--	--	--
Dibenzo(a,h)anthracene	53-70-3	5.91E-11	1.10E-10	8.33E-11	9.97E-11	8.70E-11	--	1.10E-10	--	--
Dieldrin	60-57-1	--	--	1.34E-11	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	193-39-5	--	3.04E-10	--	1.86E-10	2.03E-10	--	--	--	--

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
MLE - Most Likely Exposure.
(a) - Concentration in outdoor air is equal to the concentration in soil (mg/kg) divided by the particulate emission factor (1.18E+09 m^3/kg) calculated for the transects in Table 5-18.

TABLE 5-32
EXPOSURE POINT CONCENTRATIONS (MLE)- SITE SOILS - OUTDOOR AIR PARTICULATES
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	CAS Number	Residential Scenario EPCs for Air Site (mg/m3)	Industrial Scenario EPCs for Air Site (mg/m3)		
		N (a)	H (a)	I (a)	L (a)
Arsenic	7440-38-2	--	2.89E-08	--	2.81E-08
Benzo(a)pyrene	50-32-8	2.37E-10	--	1.04E-09	1.94E-09
Copper	7440-50-8	--	--	1.10E-05	--
Dibenzo(a,h)anthracene	53-70-3	9.18E-11	--	--	3.84E-10
Total 2,3,7,8-TCDD TEQ	1746-01-6	--	6.75E-13	5.53E-12	--
Total PCBs	1336-36-3	--	8.36E-10	5.18E-08	4.14E-10
Particulate Emission Factor (m^3/kg) (b)		7.90E+08	7.90E+08	6.04E+08	1.18E+09

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
MLE - Most Likely Exposure.
(a) - Concentration in outdoor air is equal to the concentration in soil (mg/kg) divided by the particulate emission factor.
(b) - Particulate emission factor is calculated for each site in Tables 5-18, 5-19, and 5-20.

TABLE 5-33
EXPOSURE POINT CONCENTRATIONS (MLE) - TRANSECT AREA SOILS - OUTDOOR EXCAVATION AIR
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

		Construction Scenario EPCs for Air					
		Surface Soil (mg/m3)				Subsurface Soil (mg/m3)	
Constituent	**CAS**	**T3**	**T4**	**T6**	**T7**	**T4**	**T6**
Arsenic	7440-38-2	--	--	--	5.99E-07	--	--
Benzo(a)anthracene	56-55-3	--	--	--	--	7.68E-08	--
Benzo(a)pyrene	50-32-8	8.22E-09	3.54E-08	3.02E-08	2.24E-08	3.65E-08	1.11E-08
Benzo(b)fluoranthene	205-99-2	--	--	--	--	6.42E-08	--
Dibenzo(a,h)anthracene	53-70-3	--	7.80E-09	--	--	1.43E-08	--
Dieldrin	60-57-1	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	193-39-5	--	--	--	--	--	--

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
MLE - Most Likely Exposure.
T - Transect.
(a) - Excavation air concentrations are the soil concentration (mg/kg) multiplied by the PM10 (Particulate Matter of 10 microns in diameter) dust concentration (0.06 mg/m3) (MADEP, 1995) multiplied by a unit correction factor (1E-6 kg/mg).

TABLE 5-34
EXPOSURE POINT CONCENTRATIONS (MLE) - FILL AREA SOILS - OUTDOOR EXCAVATION AIR
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	CAS Number	Construction Scenario EPCs for Air Site (mg/m3) (a)		
		H	I	L
Arsenic	7440-38-2	1.37E-06	--	2.00E-06
Benzo(a)pyrene	50-32-8	--	3.77E-08	1.38E-07
Copper	7440-50-8	--	4.00E-04	--
Dibenzo(a,h)anthracene	53-70-3	--	--	2.73E-08
Total 2,3,7,8-TCDD TEQ	1746-01-6	3.20E-11	2.00E-10	--
Total PCBs	1336-36-3	3.96E-08	1.88E-06	2.94E-08

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
MLE - Most Likely Exposure.
(a) - Excavation air concentrations are the soil concentration (mg/kg) multiplied by the PM10 (Particulate Matter of 10 microns in diameter) dust concentration (0.06 mg/m3) (MADEP, 1995) multiplied by a unit correction factor (1E-6 kg/mg).

TABLE 5-35
EXPOSURE POINT CONCENTRATIONS (MLE) - SEDIMENT AND FISH FILLET
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	CAS	EPC Sediment (mg/kg)	EPC Fish Fillet (mg/kg)
Arsenic	7440-38-2	14.80	0.45
Total PCBs	1336-36-3	0.40	--

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
MLE - Most Likely Exposure.

TABLE 5-36
EXPOSURE POINT CONCENTRATIONS (MLE) - GROUNDWATER
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Site	CAS	Groundwater EPCs (mg/L)													
		Site G			Site H			Site I						Site L	RES
Constituent Location	Number	EE-05	EEG-106	EEG-107	EE-01	EE-02	EE-03	AA-I-S1	AA-I-S2	EE-12	EE-13	EE-14	EE-15	EEG-109	DW-MCDO
1,1,2,2-Tetrachloroethane	79-34-5	--	--	--	1.20E-02	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	--	--	8.50E-01	2.20E+00	6.35E-01	--	2.21E+00	2.15E+00	--	--	1.40E+01	4.30E-01	--	--
2,4,5-TP (Silvex)	93-72-1	3.90E-01	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	--	--	--	2.70E-01	4.65E-01	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	--	--	3.60E+00	--	3.70E-01	--	--	--	--	--	--	--	2.60E-02	--
2-Chlorophenol	95-57-8	--	--	6.30E-01	--	--	--	--	--	--	--	--	--	--	--
2-Nitroaniline	88-74-4	--	--	--	--	1.35E-02	--	--	--	--	--	--	--	--	--
3-Methylphenol/4-Methylphenol	(a)	--	--	2.40E+00	--	--	--	--	--	--	--	--	--	--	--
4,4-DDE	72-55-9	--	--	--	--	--	--	--	--	2.20E-03	--	--	--	--	--
4-Chloroaniline	106-47-8	1.60E+00	--	2.30E+01	1.80E+00	7.75E-01	--	3.25E+00	3.51E-01	1.40E+00	--	1.80E+00	--	5.50E-02	--
4-Methyl-2-pentanone	108-10-1	--	--	1.30E+00	--	--	--	--	--	--	--	--	--	--	--
4-Nitroaniline	100-01-6	8.40E-03	--	--	--	--	--	--	--	--	--	--	--	--	--
alpha-BHC	319-84-6	--	8.30E-03	6.00E-03	--	4.95E-04	--	--	--	2.40E-03	--	1.10E-03	--	--	--
Antimony	7440-36-0	--	--	--	--	1.05E-01	--	--	--	--	--	--	--	--	--
Arsenic	7440-38-2	--	--	--	--	1.25E+00	--	--	--	--	--	--	--	4.30E+00	--
Benzene	71-43-2	1.10E-01	--	3.70E+00	1.50E+00	2.25E+00	--	4.55E-01	6.13E-02	6.80E-01	--	7.50E-01	--	4.40E-02	--
Benzo(k)fluoranthene	207-08-9	--	--	--	--	--	--	--	1.20E-03	--	--	--	--	--	--
beta-BHC	319-85-7	--	3.60E-04	--	--	--	--	--	--	--	--	1.00E-03	--	--	--
Cadmium	7440-43-9	--	--	--	--	--	--	--	3.63E-02	--	--	--	--	--	--
Carbazole	86-74-8	--	--	--	5.20E-03	--	--	--	--	3.50E-03	--	2.60E-02	--	--	--
Chlorobenzene	108-90-7	6.20E-01	--	4.30E+00	1.20E+00	4.35E+00	--	5.15E+00	1.66E+00	1.40E+00	--	3.80E+00	--	--	--
Chloroform	67-66-3	--	--	--	--	4.25E-01	--	--	--	--	--	--	--	7.60E-02	--
delta-BHC	319-86-8	3.60E-04	--	1.70E-02	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	--	--	--	1.80E+00	--	--	--	--	--	--	--	--	--	--
Heptachlor	76-44-8	--	--	--	--	--	--	--	--	2.50E-03	--	--	--	--	--
Heptachlor epoxide	1024-57-3	--	--	--	--	4.40E-03	--	--	--	5.60E-03	--	--	--	--	--
Lead	7439-92-1	--	--	--	--	--	--	--	--	--	--	--	--	--	1.29E-01
Molybdenum	7439-98-7	4.50E-01	--	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	3.90E-01	--	2.10E+00	2.30E+00	1.95E-01	--	--	--	--	--	--	--	--	--
Nickel	7440-02-0	--	--	--	--	--	--	--	4.40E+00	--	--	--	--	1.80E+02	--
Nitrobenzene	98-95-3	--	--	--	--	5.65E-02	--	--	--	--	--	--	--	--	--
Pentachlorophenol	87-86-5	--	--	1.01E+00	3.35E+00	6.50E-01	--	--	--	--	--	3.30E-01	--	--	--
Phenol	108-95-2	3.80E-01	--	1.40E+01	--	3.15E-01	--	--	--	--	--	--	--	--	--
Tetrachloroethene	127-18-4	--	--	1.70E-01	--	--	--	--	--	--	--	--	--	--	--
Toluene	108-88-3	--	--	8.50E+00	--	--	--	--	--	--	--	--	--	--	--
Total 2,3,7,8-TCDD TEQ	1746-01-6	1.78E-07	--	3.60E-06	4.57E-08	--	5.02E-08	--	--	3.05E-06	4.74E-08	7.69E-07	--	--	--
Total PCBs	1336-36-3	--	--	--	--	--	--	--	--	--	--	5.88E-03	--	--	--
Trichloroethene	79-01-6	--	--	2.00E-01	--	4.95E-02	--	--	1.04E-01	--	--	--	--	--	--
Vanadium	7440-62-2	--	--	3.30E-01	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride	75-01-4	--	--	4.10E-02	--	--	--	7.35E-01	2.00E-01	--	--	--	--	--	--
Zinc	7440-66-6	--	--	--	--	--	--	--	1.83E+01	--	--	--	--	--	--

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
MLE - *Most Likely Exposure.*
RES - Residential non-potable use well.

TABLE 5-37
EXPOSURE POINT CONCENTRATIONS (MLE) - INDOOR AIR VOCs
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	CAS Number	Site Indoor Air EPCs (mg/m3) (a)			
		G	H	I	L
1,1,2,2-Tetrachloroethane	79-34-5	--	2.24E-07	--	--
4-Methyl-2-pentanone	108-10-1	4.20E-05	--	--	--
Benzene	71-43-2	4.45E-04	4.45E-04	1.33E-04	4.21E-06
Chlorobenzene	108-90-7	1.43E-04	3.88E-04	4.80E-04	--
Chloroform	67-66-3	--	4.72E-05	--	6.49E-06
Ethylbenzene	100-41-4	--	2.42E-04	--	--
Naphthalene	91-20-3	1.07E-05	2.52E-05	--	--
Tetrachloroethene	127-18-4	2.24E-05	1.43E-05	--	--
Toluene	108-88-3	4.67E-04	--	--	--
Trichloroethene	79-01-6	1.62E-05	--	2.26E-05	--
Vinyl chloride	75-01-4	2.43E-05	--	4.18E-04	--

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
MLE - Most Likely Exposure.
VOCs - Volatile Organic Compounds.
(a) Calculated from average groundwater concentration for wells in each site in Appendix K.

TABLE 5-38
EXPOSURE POINT CONCENTRATIONS (MLE) - EXCAVATION AIR, VOLATILIZATION FROM EXPOSED GROUNDWATER
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Site	CAS	Site Excavation Air EPCs (mg/m3) (a)								
		G		H		I				L
Constituent Location	Number	EE-05	EEG-107	EE-01	EE-02	AA-I-S1	AA-I-S2	EE-12	EE-14	EEG-109
1,1,2,2-Tetrachloroethane	79-34-5	--	--	2.80E-04	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	--	1.25E-01	--	--	--	--	--	--	--
Benzene	71-43-2	2.98E-03	1.00E-01	4.06E-02	6.09E-02	1.23E-02	1.66E-03	1.84E-02	2.03E-02	1.19E-03
Chlorobenzene	108-90-7	1.55E-02	1.07E-01	3.00E-02	1.09E-01	1.29E-01	4.14E-02	3.50E-02	9.49E-02	--
Chloroform	67-66-3	--	--	--	1.16E-02	--	--	--	--	2.08E-03
Ethylbenzene	100-41-4	--	--	4.19E-02	--	--	--	--	--	--
Naphthalene	91-20-3	8.51E-03	4.58E-02	5.02E-02	4.26E-03	--	--	--	--	--
Tetrachloroethene	127-18-4	--	4.10E-03	--	--	--	--	--	--	--
Toluene	108-88-3	--	2.24E-01	--	--	--	--	--	--	--
Trichloroethene	79-01-6	--	2.62E-02	--	6.48E-03	--	1.36E-02	--	--	--
Vinyl chloride	75-01-4	--	1.30E-03	--	--	2.32E-02	6.32E-03	--	--	--

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
MLE - Most Likely Exposure.
(a) Excavation air concentration (mg/m3) = groundwater concentration (mg/l) * groundwater-to-air attenuation factor (l/m^3) calculated in Appendix L.

TABLE 5-39
EXPOSURE POINT CONCENTRATIONS (MLE) - OUTDOOR AIR VOCs
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	CAS Number	Site Outdoor Air EPCs (mg/m3) (a)			
		G	H	I	L
1,1,2,2-Tetrachloroethane	79-34-5	--	5.50E-08	--	--
4-Methyl-2-pentanone	108-10-1	9.40E-07	--	--	--
Benzene	71-43-2	1.20E-05	2.70E-05	7.90E-06	3.00E-07
Chlorobenzene	108-90-7	9.70E-06	2.40E-05	2.90E-05	--
Chloroform	67-66-3	--	2.60E-06	--	4.30E-07
Ethylbenzene	100-41-4	--	1.70E-05	--	--
Naphthalene	91-20-3	7.00E-07	1.50E-06	--	--
Tetrachloroethene	127-18-4	1.70E-06	--	--	--
Toluene	108-88-3	3.20E-05	1.20E-06	--	--
Trichloroethene	79-01-6	1.60E-06	--	1.90E-06	--
Vinyl chloride	75-01-4	4.60E-06	--	7.10E-05	--

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
MLE - Most Likely Exposure.
VOCs - Volatile Organic Compounds.
(a) Calculated from average groundwater concentration for wells in each site, as shown in Appendix M.

TABLE 5-40
EXPOSURE POINT CONCENTRATIONS (MLE)- PRODUCE GROWN IN TRANSECT SOILS
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	CAS Number	Constituent Specific Inputs for Prediction of Produce Concentrations (a)			Transect 7 Predicted Produce Concentrations	
		Log Kow	Br_{ag}	$Br_{rootveg}$	Above Ground (mg/kg DW)	Below Ground (mg/kg DW)
Arsenic	7440-38-2	NA	6.33E-03	8.00E-03	9.49E-03	1.20E-02

Notes:
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
FW - Fresh Weight.
EPC - Exposure Point Concentration.
MLE - Most Likely Exposure.
NA - Not Applicable.
(a) USEPA, 1998d. Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities. Volume Two. Appendix A. United States Environmental Protection Agency. Solid Waste and Emergency Response. EPA530-D-98-001B. July 1998. Calculations discussed in Appendix N.
(b) USEPA, 1998. Methodology for Assessing Health Risks Associated with Multiple Pathways of Exposure to Combustor Emissions. USEPA National Center for Environmental Assessment. EPA600/R-98/137.
Above Ground Produce Concentration = C_s x Br_{ag} x 0.15, where vegetable moisture content is assumed to be an average 85% (b).
Below Ground Produce Concentration = C_s x $Br_{rootveg}$ x 0.15, where vegetable moisture content is assumed to be an average 85% (b).
C_s = Concentration of constituent in soil.
Br_{ag} = Plant-soil bioconcentration factor for above ground produce.
$Br_{rootveg}$ = Plant-soil bioconcentration factor for below ground produce.

TABLE 5-41
ABSORPTION ADJUSTMENT FACTORS (AAFs) FOR CHRONIC EXPOSURE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Exposure Route (Medium)											
	Oral	(Water)	Oral	(Soil)	Oral	(Diet)	Dermal	(Water)	Dermal	(Soil)	Inhalation	
Constituent	Carc.	Noncarc.	Carc.	Noncarc.	Carc.	Noncarc.	Carc.	Noncarc.	Carc.	Noncarc.	Carc.	Noncarc.
1,1,2,2-Tetrachloroethane	1	1	1	1	1	1	1	1	0.01	0.01	1	NA
1,4-Dichlorobenzene	1	1	1	1	1	1	1	1	0.01	0.01	1	1
2,4,5-TP (Silvex)	NA	1	NA	1	NA	1	NA	1	NA	0.01	NA	NA
2,4,6-Trichlorophenol	1	NA	1	NA	1	NA	1	NA	0.01	NA	1	NA
2,4-Dichlorophenol	NA	1	NA	1	NA	1	NA	1	NA	0.01	1	1
2-Chlorophenol	NA	1	NA	1	NA	1	NA	1	NA	0.01	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1
3-Methylphenol/4-Methylphenol	NA	1	NA	1	NA	1	NA	1	NA	0.01	NA	NA
4,4-DDE	1	NA	1	NA	1	NA	1	NA	0.01	NA	NA	NA
4-Chloroaniline	NA	1	NA	1	NA	1	NA	1	NA	0.01	NA	NA
4-Methyl-2-pentanone	NA	1	NA	1	NA	1	NA	1	NA	0.01	NA	1
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1
Acetone	NA	1	NA	1	NA	1	NA	1	NA	0.01	NA	NA
alpha-BHC	1	NA	1	NA	1	NA	1	NA	0.01	NA	1	NA
Antimony	NA	1	NA	1	NA	1	NA	6.7	NA	0.007	NA	NA
Arsenic	1	1	0.3	0.3	1	1	1	1	0.001	0.001	1	NA
Benzene	1	1	1	1	1	1	2.13	2.13	0.02	0.02	1	1
Benzo(a)anthracene	1	NA	0.29	NA	1	NA	1	NA	0.02	NA	1	NA
Benzo(a)pyrene	1	NA	0.29	NA	1	NA	1	NA	0.02	NA	1	NA
Benzo(b)fluoranthene	1	NA	0.29	NA	1	NA	1	NA	0.02	NA	1	NA
Benzo(k)fluoranthene	1	NA	0.29	NA	1	NA	1	NA	0.02	NA	1	NA
beta-BHC	1	NA	1	NA	1	NA	1	NA	0.01	NA	1	NA
Cadmium	NA	1	NA	1	NA	1	NA	40	NA	0.04	1	NA
Carbazole	1	NA	1	NA	1	NA	1	NA	0.01	NA	NA	NA
Chlorobenzene	NA	1	NA	1	NA	1	NA	1	NA	0.01	NA	1
Chloroform	1	1	1	1	1	1	1	1	0.01	0.01	0.66	1
Cis/Trans-1,2-Dichloroethene	NA	1	NA	1	NA	1	NA	1	NA	0.01	NA	NA
Copper	NA	1	NA	1	NA	1	NA	1.67	NA	0.002	NA	NA
delta-BHC	NA	1	NA	1	NA	1	NA	1	NA	0.01	NA	NA
Dibenzo(a,h)anthracene	1	NA	0.29	NA	1	NA	1	NA	0.02	NA	1	NA
Dieldrin	1	1	1	1	1	1	1	1	0.01	0.01	1	NA
Ethylbenzene	NA	1	NA	1	NA	1	NA	1	NA	0.01	NA	1
gamma-BHC	1	1	1	1	1	1	1	1	0.01	0.01	NA	NA
Heptachlor	1	1	1	1	1	1	1	1	0.01	0.01	1	NA
Heptachlor epoxide	1	1	1	1	1	1	1	1	0.01	0.01	1	NA
Indeno(1,2,3-cd)pyrene	1	NA	0.29	NA	1	NA	1	NA	0.02	NA	1	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Molybdenum	NA	1	NA	1	NA	1	NA	1	NA	0.001	NA	NA
Naphthalene	NA	1	NA	0.29	NA	1	NA	1	NA	0.1	NA	1
Nickel	NA	1	NA	1	NA	1	NA	77	NA	0.08	NA	NA

TABLE 5-41
ABSORPTION ADJUSTMENT FACTORS (AAFs) FOR CHRONIC EXPOSURE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Exposure Route (Medium)											
	Oral	(Water)	Oral	(Soil)	Oral	(Diet)	Dermal	(Water)	Dermal	(Soil)	Inhalation	
Constituent	Carc.	Noncarc.	Carc.	Noncarc.	Carc.	Noncarc.	Carc.	Noncarc.	Carc.	Noncarc.	Carc.	Noncarc.
Nitrobenzene	NA	1	NA	1	NA	1	NA	1	NA	0.01	NA	1
Pentachlorophenol	1	1	1	1	1	1	1	1	0.01	0.01	NA	NA
Phenol	NA	1	NA	1	NA	1	NA	1	NA	0.01	NA	NA
Tetrachloroethene	1	1	1	1	1	1	1	1	0.01	0.01	1	1
Toluene	NA	1	NA	1	NA	1	NA	1	NA	0.01	NA	1
Total 2,3,7,8-TCDD TEQ	1	NA	0.5	NA	1	NA	1.8	NA	0.05	NA	1	NA
Total PCBs	1	1	0.83	0.83	1	1	1.1	1.1	0.04	0.04	1	NA
Trichloroethene	1	1	1	1	1	1	1	1	0.01	0.01	1	NA
Vanadium	NA	1	NA	1	NA	1	NA	10	NA	0.01	NA	NA
Vinyl chloride	1	1	1	1	1	1	1	1	0.01	0.01	1	1
Zinc	NA	1.6	NA	1	NA	1	NA	3.03	NA	0.003	NA	NA

Notes:
All Absorption Adjustment Factors were derived by ENSR.
Carc. - The value derived is for assessing the compound's carcinogenic potential.
Noncarc. - The value derived is for assessing the compound's noncarcinogenic potential.

TABLE 5-42
DERMAL PERMEABILITY CONSTANTS
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	**Dermal Permeability Constant (cm/hr) (a)**	
1,1,2,2-Tetrachloroethane	9.00E-03	
1,4-Dichlorobenzene	6.20E-02	
2,4,5-TP (Silvex)	2.33E-03	(k)
2,4,6-Trichlorophenol	5.00E-02	
2,4-Dichlorophenol	2.30E-02	
2-Chlorophenol	1.10E-02	
2-Nitroaniline	5.45E-03	(k)
3-Methylphenol/4-Methylphenol	1.00E-02	(b)
4,4-DDE	2.40E-01	
4-Chloroaniline	6.33E-03	(k)
4-Methyl-2-pentanone	2.77E-03	(k)
4-Nitroaniline	2.66E-03	(k)
Acetone	5.69E-04	(k)
alpha-BHC	1.63E-02	(k)
Antimony	1.60E-04	(d)
Arsenic	1.60E-04	(d)
Benzene	2.10E-02	
Benzo(a)anthracene	8.10E-01	
Benzo(a)pyrene	1.20E+00	
Benzo(b)fluoranthene	1.20E+00	
Benzo(k)fluoranthene	1.20E+00	(c)
beta-BHC	1.60E-02	(k)
Cadmium	1.00E-03	(e)
Carbazole	7.97E-02	(k)
Chlorobenzene	4.10E-02	
Chloroform	8.90E-03	
Cis/Trans-1,2-Dichloroethene	1.00E-02	
Copper	1.60E-04	(d)
delta-BHC	1.60E-02	(k)
Dibenzo(a,h)anthracene	2.70E+00	
Dieldrin	1.60E-02	
Ethylbenzene	7.40E-02	
gamma-BHC	1.40E-02	
Heptachlor	1.10E-02	
Heptachlor epoxide	1.10E-02	(f)
Indeno(1,2,3-cd)pyrene	1.90E+00	

TABLE 5-42
DERMAL PERMEABILITY CONSTANTS
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Dermal Permeability Constant (cm/hr) (a)	
Lead	4.00E-06	(g)
Molybdenum	1.60E-04	(d)
Naphthalene	6.90E-02	
Nickel	5.45E-05	(h)
Nitrobenzene	6.96E-03	(k)
Pentachlorophenol	6.50E-01	
Phenol	5.50E-03	
Tetrachloroethene	4.80E-02	
Toluene	4.50E-02	
Total 2,3,7,8-TCDD TEQ	1.40E+00	
Total PCBs	7.10E-01	(i)
Trichloroethene	1.60E-02	
Vanadium	1.60E-04	(d)
Vinyl chloride	7.30E-03	
Zinc	6.00E-04	(j)

Notes:
(a) All values are from USEPA, 1992b, Dermal Exposure Assessment: Principles and Applications, Table 5-7, unless otherwise noted.
(b) Average value of 3-Methylphenol and 4-methylphenol
(c) Due to structural similarity, the value for benzo(b)fluoranthene is used to evaluate this constituent.
(d) Value for water (USEPA, 1992b, Table 5-7)
(e) Value for cadmium chloride (USEPA, 1992b, Table 5-3)
(f) Due to structural similarity, the value for heptachlor is used to evaluate this constituent.
(g) Value for lead acetate (USEPA, 1992b, Table 5-3)
(h) Average of values for nickel chloride and nickel sulfate (USEPA, 1992b, Table 5-3)
(i) Value for PCB hexachlorobiphenyl (USEPA, 1992b, Table 5-7)
(j) Value for zinc chloride (USEPA, 1992b, Table 5-3)
(k) Calculated in Table 5-43 using logKow, molecular weight, and equation 5.8 from USEPA, 1992b.

TABLE 5-43
DERMAL PERMEABILITY CONSTANTS - CALCULATED VALUES (d)
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Molecular Weight (g)	Log Kow		Log PC	Dermal Permeability Constant (cm/hr) (b)
2,4,5- TP (Silvex)	269.53	2.44	(a)	-2.631733	2.33E-03
2-Nitroaniline	138.13	1.83	(a)	-2.263293	5.45E-03
4-Chloroaniline	127.57	1.83	(a)	-2.198877	6.33E-03
4-Methyl-2-Pentanone	100.16	1.09	(a)	-2.557076	2.77E-03
4-Nitroaniline	138.13	1.39	(a)	-2.575693	2.66E-03
Acetone	58.08	-0.24	(a)	-3.244688	5.69E-04
Alpha-BHC	290.83	3.81	(a)	-1.788963	1.63E-02
Beta-BHC	290.83	3.8	(a)	-1.796063	1.60E-02
Carbazole	167.21	3.72	(c)	-1.098781	7.97E-02
Delta-BHC	290.83	4.14	(a)	-1.554663	2.79E-02
Nitrobenzene	123.11	1.85	(a)	-2.157471	6.96E-03

Notes:
Kow - Octanol-Water Partition Coefficient.
PC - Permeability Constant.
(a) Handbook of RCRA Groundwater Monitoring Constituents. Physical and Chemical Properties. USEPA. September 1992d.
(b) USEPA, 1992b Dermal Exposure Equation 5.8: Log Kp = -2.72 + 0.71 log Kow - 0.0061 MW
(c) Handbook of Physical Properties of Organic Chemicals. Lyman, 1997
(d) Values not presented in USEPA, 1992b.

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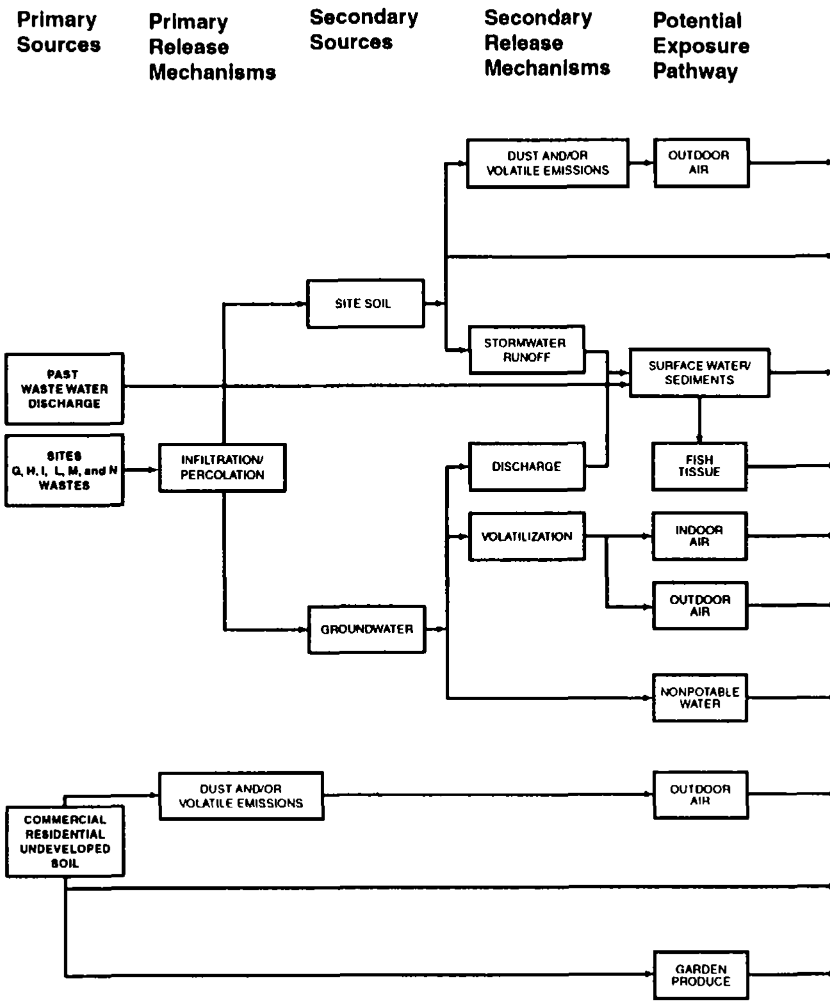

Potential Receptors

POTENTIAL EXPOSURE ROUTE	INDOOR INDUSTRIAL WORKER (a), (b)	OUTDOOR INDUSTRIAL WORKER (a),(b)	CONSTRUCTION/ UTILITY WORKER (a), (b)	RESIDENT (b), (d)	RECREATIONAL TEENAGER (c)	TRESPASSING TEENAGER (a)	RECREATIONAL FISHER (c)
INHALATION	○	●	●			●	
INCIDENTAL INGESTION	○	●	●			●	
DERMAL CONTACT	○	●	●			●	
INCIDENTAL INGESTION				○ (e)	●		●
DERMAL CONTACT				○ (e)	●		●
INGESTION							●
INHALATION	●	○	○				
INHALATION	○	●	●			●	
INCIDENTAL INGESTION	○	○	●	●			
DERMAL CONTACT	○	○	●	●			
INHALATION	○	●	●	●			
INCIDENTAL INGESTION	○	●	●	●			
DERMAL CONTACT	○	●	●	●			
INGESTION				●			

Key:

● Pathway potentially complete, further evaluation recommended

○ Pathway evaluated and found incomplete or insignificant, no further evaluation recommended

Boxes without circles indicate that pathway is not applicable to that receptor

(a) Sites
(b) Residential, commercial, undeveloped areas
(c) Dead Creek and Borrow Pit Lake - areas not included in the sediment removal action
(d) Fill Area N will be evaluated for potential residential receptors
(e) Dead Creek Segments adjacent to residential areas are included in the sediment removal action

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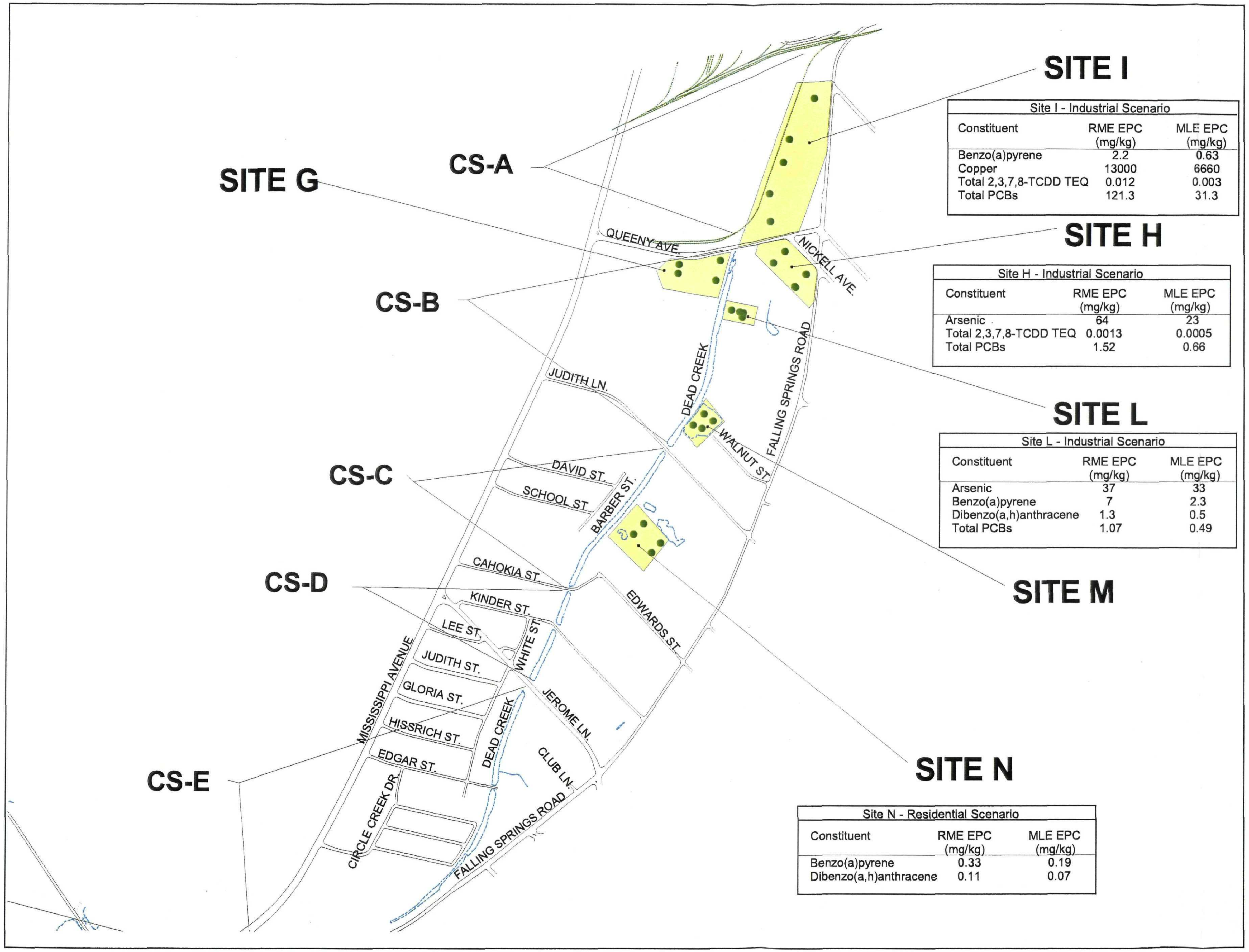
FIGURE 5-1
Conceptual Site Model for Human Health Risk Assessment
Sauget Area 1 EE/CA and RI/FS, Sauget and Cahokia, Illinois Solutia, Inc.

M2K0266a



Site I - Industrial Scenario

Constituent	RME EPC (mg/kg)	MLE EPC (mg/kg)
Benzo(a)pyrene	2.2	0.63
Copper	13000	6660
Total 2,3,7,8-TCDD TEQ	0.012	0.003
Total PCBs	121.3	31.3

Site H - Industrial Scenario

Constituent	RME EPC (mg/kg)	MLE EPC (mg/kg)
Arsenic	64	23
Total 2,3,7,8-TCDD TEQ	0.0013	0.0005
Total PCBs	1.52	0.66

Site L - Industrial Scenario

Constituent	RME EPC (mg/kg)	MLE EPC (mg/kg)
Arsenic	37	33
Benzo(a)pyrene	7	2.3
Dibenzo(a,h)anthracene	1.3	0.5
Total PCBs	1.07	0.49

Site N - Residential Scenario

Constituent	RME EPC (mg/kg)	MLE EPC (mg/kg)
Benzo(a)pyrene	0.33	0.19
Dibenzo(a,h)anthracene	0.11	0.07

N

LEGEND

- Site
- Water Body
- Roads
- Soil Sample Locations
- CS-A Dead Creek Segment Designations
- RME Reasonable Maximum Exposure
- MLE Most Likely Exposure

FIGURE 5-2

Direct Contact - Site Soils
Residential and Industrial Scenarios
Exposure Point Concentrations (EPCs)

Sauget Area 1
EE/CA and RI/FS
Volume II
Human Health Risk Assessment

Solutia, Inc.
Remediation Technology Group
St. Louis, Missouri

2000 0 2000 Feet

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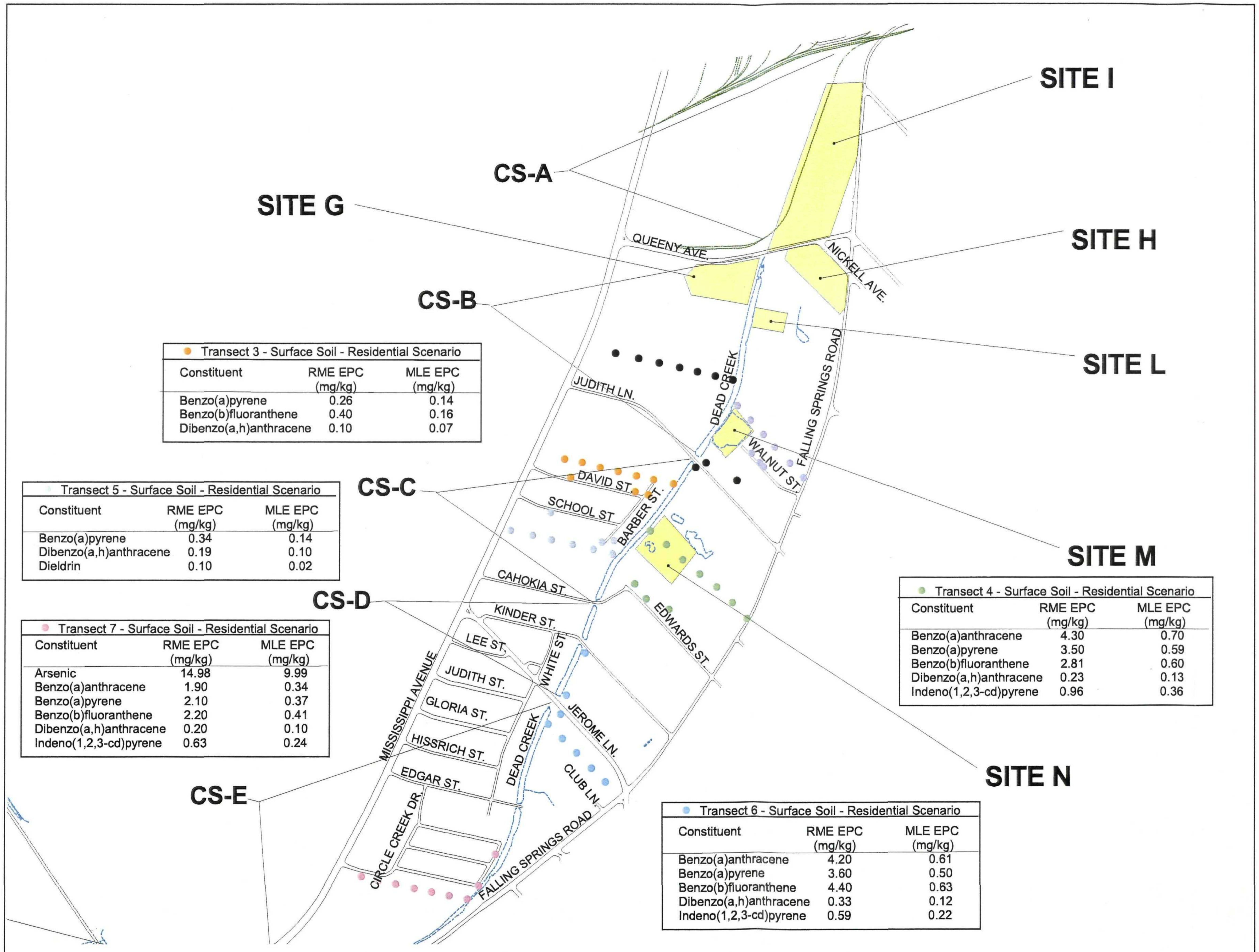

Transect 3 - Surface Soil - Residential Scenario

Constituent	RME EPC (mg/kg)	MLE EPC (mg/kg)
Benzo(a)pyrene	0.26	0.14
Benzo(b)fluoranthene	0.40	0.16
Dibenzo(a,h)anthracene	0.10	0.07

Transect 5 - Surface Soil - Residential Scenario

Constituent	RME EPC (mg/kg)	MLE EPC (mg/kg)
Benzo(a)pyrene	0.34	0.14
Dibenzo(a,h)anthracene	0.19	0.10
Dieldrin	0.10	0.02

Transect 7 - Surface Soil - Residential Scenario

Constituent	RME EPC (mg/kg)	MLE EPC (mg/kg)
Arsenic	14.98	9.99
Benzo(a)anthracene	1.90	0.34
Benzo(a)pyrene	2.10	0.37
Benzo(b)fluoranthene	2.20	0.41
Dibenzo(a,h)anthracene	0.20	0.10
Indeno(1,2,3-cd)pyrene	0.63	0.24

Transect 4 - Surface Soil - Residential Scenario

Constituent	RME EPC (mg/kg)	MLE EPC (mg/kg)
Benzo(a)anthracene	4.30	0.70
Benzo(a)pyrene	3.50	0.59
Benzo(b)fluoranthene	2.81	0.60
Dibenzo(a,h)anthracene	0.23	0.13
Indeno(1,2,3-cd)pyrene	0.96	0.36

Transect 6 - Surface Soil - Residential Scenario

Constituent	RME EPC (mg/kg)	MLE EPC (mg/kg)
Benzo(a)anthracene	4.20	0.61
Benzo(a)pyrene	3.60	0.50
Benzo(b)fluoranthene	4.40	0.63
Dibenzo(a,h)anthracene	0.33	0.12
Indeno(1,2,3-cd)pyrene	0.59	0.22

N

LEGEND

- Site
- Water Body
- Roads
- Transect 1
- Transect 2
- Transect 3
- Transect 4
- Transect 5
- Transect 6
- Transect 7

CS-A Dead Creek Segment Designations
RME Reasonable Maximum Exposure
MLE Most Likely Exposure

FIGURE 5-3
Residential Scenario
Transect Surface Soil
Exposure Point Concentrations (EPCs)

Sauget Area 1
EE/CA and RI/FS
Volume II
Human Health Risk Assessment

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Remediation Technology Group
St. Louis, Missouri

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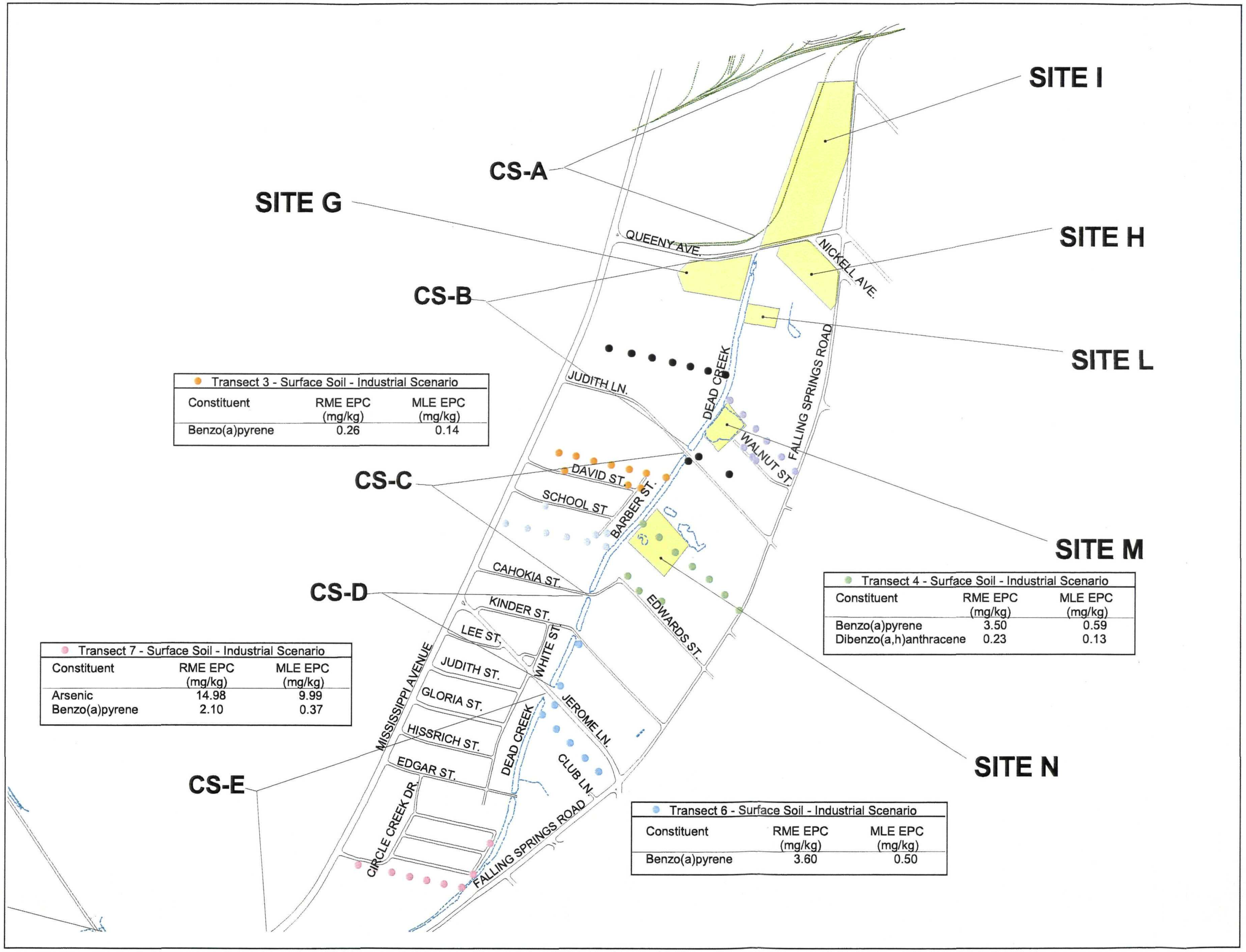

Transect 3 - Surface Soil - Industrial Scenario		
Constituent	RME EPC (mg/kg)	MLE EPC (mg/kg)
Benzo(a)pyrene	0.26	0.14

Transect 4 - Surface Soil - Industrial Scenario		
Constituent	RME EPC (mg/kg)	MLE EPC (mg/kg)
Benzo(a)pyrene	3.50	0.59
Dibenzo(a,h)anthracene	0.23	0.13

Transect 7 - Surface Soil - Industrial Scenario		
Constituent	RME EPC (mg/kg)	MLE EPC (mg/kg)
Arsenic	14.98	9.99
Benzo(a)pyrene	2.10	0.37

Transect 6 - Surface Soil - Industrial Scenario		
Constituent	RME EPC (mg/kg)	MLE EPC (mg/kg)
Benzo(a)pyrene	3.60	0.50

FIGURE 5-4

Industrial Scenario
Transect Surface Soil
Exposure Point Concentrations (EPCs)

Sauget Area 1
EE/CA and RI/FS
Volume II
Human Health Risk Assessment

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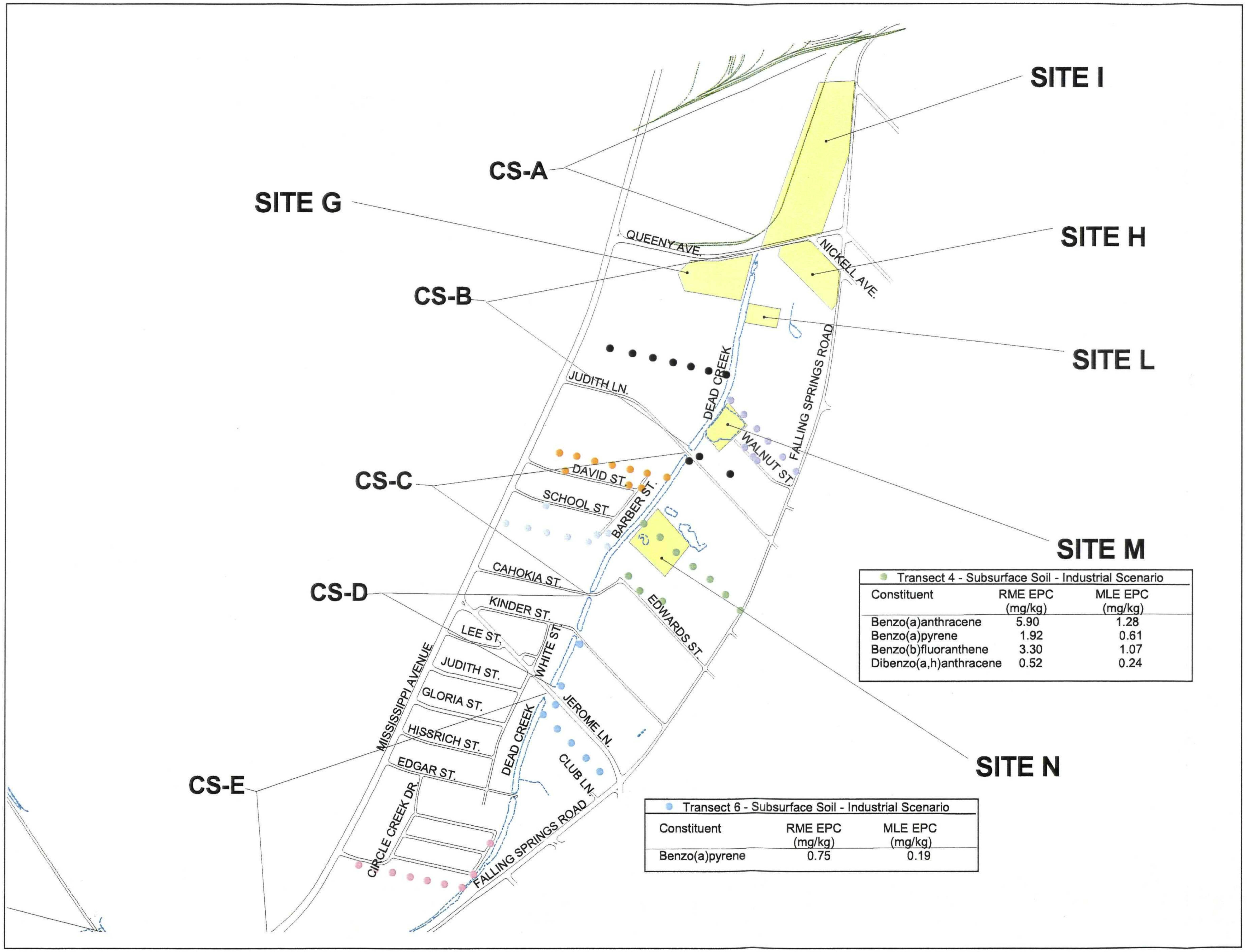

Transect 4 - Subsurface Soil - Industrial Scenario

Constituent	RME EPC (mg/kg)	MLE EPC (mg/kg)
Benzo(a)anthracene	5.90	1.28
Benzo(a)pyrene	1.92	0.61
Benzo(b)fluoranthene	3.30	1.07
Dibenzo(a,h)anthracene	0.52	0.24

Transect 6 - Subsurface Soil - Industrial Scenario

Constituent	RME EPC (mg/kg)	MLE EPC (mg/kg)
Benzo(a)pyrene	0.75	0.19

FIGURE 5-5
Industrial Scenario
Transect Subsurface Soil
Exposure Point Concentrations (EPCs)

Sauget Area 1
EE/CA and RI/FS
Volume II
Human Health Risk Assessment

Solutia, Inc.
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AA-I-S2 - Groundwater

Constituent	RME EPC (mg/l)	MLE EPC (mg/l)
1,4-Dichlorobenzene	4.2	2.15
4-Chloroaniline	0.68	0.351
Benzene	0.12	0.0613
Chlorobenzene	3.2	1.66
Trichloroethene	0.18	0.104
Vinyl chloride	0.24	0.2

AA-I-S1 - Groundwater

Constituent	RME EPC (mg/l)	MLE EPC (mg/l)
1,4-Dichlorobenzene	4.4	2.21
4-Chloroaniline	4.1	3.25
Benzene	0.62	0.455
Chlorobenzene	8.7	5.15
Vinyl chloride	0.97	0.735

EE-15 - Groundwater

Constituent	RME EPC (mg/l)	MLE EPC (mg/l)
1,4-Dichlorobenzene	0.43	0.43

EE-13 - Groundwater

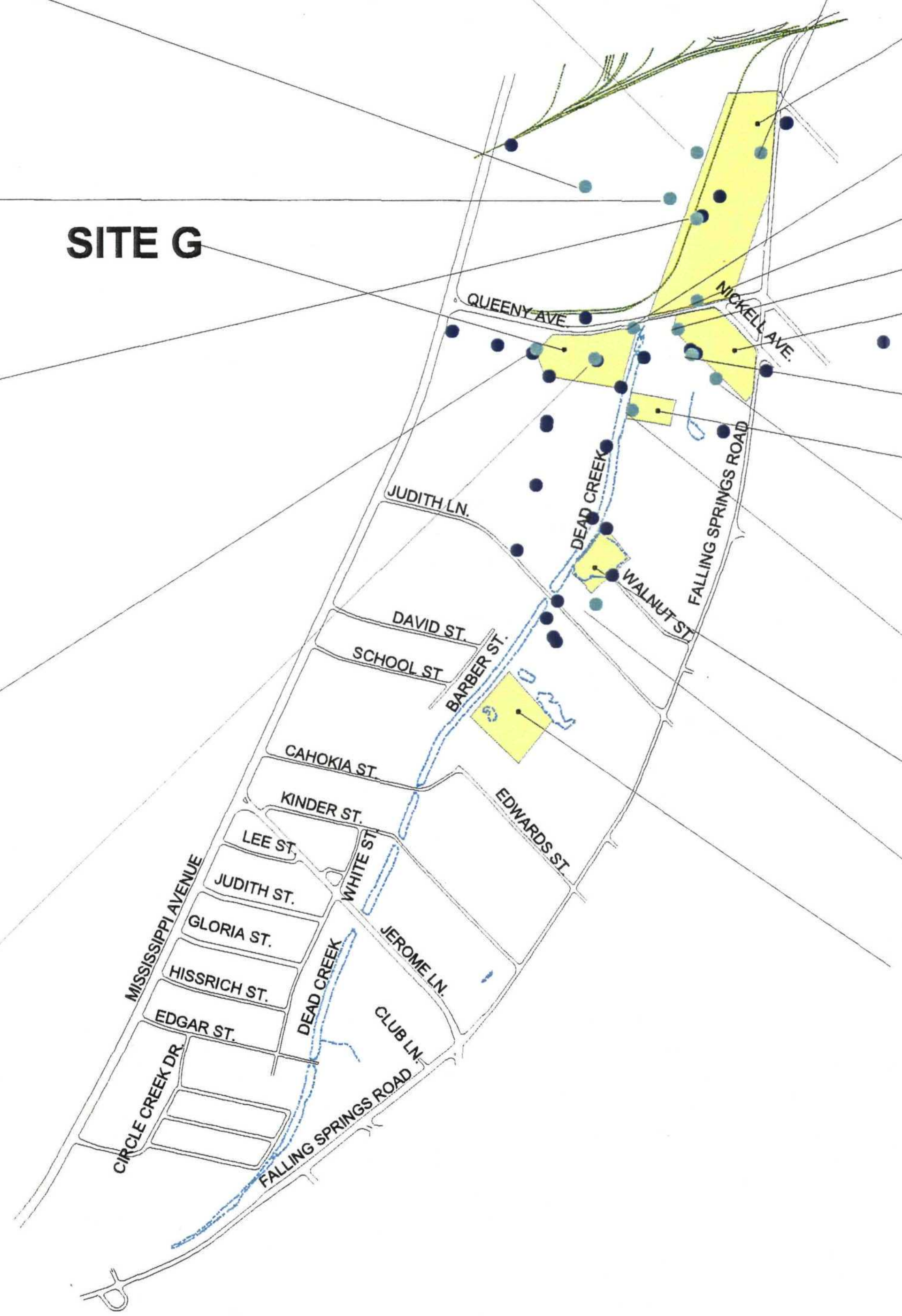
Constituent	RME EPC (mg/l)	MLE EPC (mg/l)
Total 2,3,7,8-TCDD TEQ	4.74E-08	4.74E-08

EEG-106 - Groundwater

Constituent	RME EPC (mg/l)	MLE EPC (mg/l)
alpha-BHC	0.0083	0.0083
beta-BHC	0.00036	0.00036

EE-12 - Groundwater

Constituent	RME EPC (mg/l)	MLE EPC (mg/l)
4-Chloroaniline	1.4	1.4
alpha-BHC	0.00245	0.00245
Benzene	0.68	0.68
Carbazole	0.0035	0.0035
Chlorobenzene	1.4	1.4
Total 2,3,7,8-TCDD TEQ	3.05E-06	3.05E-06



EE-14 - Groundwater

Constituent	RME EPC (mg/l)	MLE EPC (mg/l)
1,4-Dichlorobenzene	14	14
4-Chloroaniline	1.8	1.8
alpha-BHC	0.0011	0.0011
Benzene	0.75	0.75
beta-BHC	0.001	0.001
Carbazole	0.026	0.026
Chlorobenzene	3.8	3.8
Pentachlorophenol	0.5	0.33
Total 2,3,7,8-TCDD TEQ	7.69E-07	7.69E-07
Total PCBs	0.00588	0.00588

EE-05 - Groundwater

Constituent	RME EPC (mg/l)	MLE EPC (mg/l)
4-Chloroaniline	1.6	1.6
Benzene	0.11	0.11
Chlorobenzene	0.62	0.62
delta-BHC	0.00036	0.00036
Naphthalene	0.39	0.39
Phenol	0.38	0.38
Total 2,3,7,8-TCDD TEQ	1.78E-07	1.78E-07

EEG-107 - Groundwater

Constituent	RME EPC (mg/l)	MLE EPC (mg/l)
1,4-Dichlorobenzene	0.85	0.85
2,4-Dichlorophenol	3.6	3.6
4-Chloroaniline	23	23
alpha-BHC	0.006	0.006
Benzene	3.7	3.7
Chlorobenzene	4.3	4.3
delta-BHC	0.017	0.017
Naphthalene	2.1	2.1
Pentachlorophenol	2.0	1.01
Phenol	14	14
Total 2,3,7,8-TCDD TEQ	3.60E-06	3.60E-06
Trichloroethene	0.2	0.2
Vinyl chloride	0.041	0.041

EE-01 - Groundwater

Constituent	RME EPC (mg/l)	MLE EPC (mg/l)
1,4-Dichlorobenzene	2.2	2.2
2,4,6-Trichlorophenol	0.27	0.27
4-Chloroaniline	1.8	1.8
Benzene	1.5	1.5
Carbazole	0.0052	0.0052
Chlorobenzene	1.2	1.2
Naphthalene	2.3	2.3
Pentachlorophenol	4.3	3.35
Total 2,3,7,8-TCDD TEQ	4.57E-08	4.57E-08

EE-02 - Groundwater

Constituent	RME EPC (mg/l)	MLE EPC (mg/l)
1,4-Dichlorobenzene	0.635	0.635
2,4,6-Trichlorophenol	0.465	0.465
2,4-Dichlorophenol	0.37	0.37
4-Chloroaniline	0.775	0.775
alpha-BHC	0.000495	0.000495
Benzene	2.25	2.25
Chlorobenzene	4.35	4.35
Chloroform	0.425	0.425
Naphthalene	0.195	0.195
Pentachlorophenol	0.67	0.65
Phenol	0.315	0.315
Trichloroethene	0.0495	0.0495

EE-03 - Groundwater

Constituent	RME EPC (mg/l)	MLE EPC (mg/l)
Total 2,3,7,8-TCDD TEQ	5.02E-08	5.02E-08

EEG-109 - Groundwater

Constituent	RME EPC (mg/l)	MLE EPC (mg/l)
2,4-Dichlorophenol	0.026	0.026
4-Chloroaniline	0.055	0.055
Benzene	0.044	0.044
Chloroform	0.076	0.076

DW-MCDO-1 - Groundwater

Constituent	RME EPC (mg/l)	MLE EPC (mg/l)
Lead	0.129	0.129

N

LEGEND

- Site
- Water Body
- Roads
- Groundwater Sample Locations
- Groundwater Sample Locations Quantitatively Evaluated in the HHRA

RME Reasonable Maximum Exposure

MLE Most Likely Exposure

FIGURE 5-6

Groundwater - Selected Exposure Point Concentrations (EPCs)

Sauget Area 1
EE/CA and RI/FS
Volume II
Human Health Risk Assessment

Solutia, Inc.
Remediation Technology Group
St. Louis, Missouri

3000 0 3000 Feet

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December 29, 2000
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6.0 RISK CHARACTERIZATION

The potential risk to human health associated with potential exposure to COPC in environmental media at the site is evaluated in this step of the risk assessment process. Risk characterization is the process in which the dose-response information (Section 4.0) is integrated with quantitative estimates of human exposure derived in the Exposure Assessment (Section 5.0). The result is a quantitative estimate of the likelihood that humans will experience any adverse health effects given the exposure assumptions made. Two general types of health risk are characterized for each potential exposure pathway considered: potential carcinogenic risk and potential noncarcinogenic risk. Carcinogenic risk is evaluated by averaging exposure over a normal human lifetime, which, based on USEPA guidance (1989a), is assumed to be 70 years. Noncarcinogenic risk is evaluated by averaging exposure over the total exposure period.

Characterization of the potential impact of potential carcinogenic and noncarcinogenic constituents is approached in very different ways. The difference in approaches arises from the conservative assumption that substances with possible carcinogenic action proceed by a no-threshold mechanism, whereas other toxic actions may have a threshold, a dose below which few individuals would be expected to respond. Thus, under the no-threshold assumption, it is necessary to calculate a risk, but for constituents with a threshold, it is possible to simply characterize an exposure as above or below the threshold. In risk assessment, that threshold is termed a reference dose (RfD). Reference doses as well as cancer slope factors were discussed in Section 4.0. The approach to carcinogenic risk characterization is presented in Section 6.1, and the approach to noncarcinogenic risk characterization is presented in Section 6.2. The risk characterization results are presented in Section 6.3. The soil to groundwater pathway is discussed in Section 6.4. Uncertainties associated with the risk characterization are presented in Section 6.5. The risk calculation spreadsheets are presented in Appendix P.

6.1 Carcinogenic Risk Characterization

The purpose of carcinogenic risk characterization is to estimate the upper-bound likelihood, over and above the background cancer rate, that a receptor will develop cancer in his or her lifetime as a result of exposure to a constituent in environmental media at the site. This likelihood is a function of the dose of a constituent (described in the Exposure Assessment, Section 5.0) and the Cancer Slope Factor (CSF) (described in the Toxicity Assessment, Section 4.0) for that constituent. The Excess Lifetime Cancer Risk (ELCR) is the likelihood over and above the background cancer rate, which currently in the US is between 1 in 3 and 1 in 4 (Landis et al., 1998), that an individual will contract cancer in his or her lifetime. The risk value is expressed as a probability (e.g., 10^{-6}, or one in one million). The relationship between the ELCR and the estimated Lifetime Average Daily Dose (LADD) of a constituent may be expressed as:

$$ELCR = 1\text{-}e^{-(CSF \times LADD)}$$

When the product of the CSF and the LADD is much greater than 1, the ELCR approaches 1 (i.e., 100 percent probability). When the product is less than 0.01 (one chance in 100), the equation can be closely approximated by:

$$ELCR = LADD\ (mg/kg\text{-}day) \times CSF\ (mg/kg\text{-}day)^{-1}$$

The product of the CSF and the LADD is unitless, and provides an upper-bound estimate of the potential carcinogenic risk associated with a receptor's exposure to that constituent via that pathway.

The potential carcinogenic risk for each exposure pathway is calculated for each receptor. In current regulatory risk assessment, it is assumed that cancer risks are additive or cumulative. Pathway and area-specific risks are summed to estimate the total site potential cancer risk for each receptor. A summary of the total site cancer risks for each receptor group is presented in this section and compared to the USEPA's target risk range of 10^{-4} to 10^{-6}. Any COPC that causes an exceedence of 10^{-4} risk level for a particular receptor is designated a COC. The target risk levels used for the identification of COCs are based on USEPA guidance and Illinois TACO guidance. Specifically, USEPA provides the following guidance (USEPA, 1991a):

> "Where the cumulative carcinogenic site risk to an individual based on reasonable maximum exposure for both current and future land use is less than 10^{-4}, and the non-carcinogenic hazard quotient is less than 1, action generally is not warranted unless there are adverse environmental impacts." and,
>
> "The upper boundary of the risk range is not a discrete line at 1 x 10^{-4}, although EPA generally uses 1 x 10^{-4} in making risk management decisions. A specific risk estimate around 10^{-4} may be considered acceptable if justified based on site-specific conditions."

IEPA provides the following summary for the evaluation of cumulative risk for carcinogens (IEPA, 1998, Fact Sheet 13: Mixture Rule):

> "The cumulative risk of carcinogenic contaminants attacking the same target must not exceed 1 in 10,000 [10^{-4}]. Therefore, the risk from all on-site similar acting carcinogens must be added together. If this cumulative risk level is greater than 1 in 10,000, corrective action must be taken to reach an acceptable risk level."

Both RME and MLE results are considered in the identification of COCs. Remedial goals (RGs) are calculated for each COC in Section 8.0.

6.2 Noncarcinogenic Risk Characterization

The potential for exposure to a constituent to result in adverse noncarcinogenic health effects is estimated for each receptor by comparing the Chronic Average Daily Dose (CADD) for each COPC with the RfD for that COPC. The resulting ratio, which is unitless, is known as the Hazard Quotient (HQ) for that constituent. The HQ is calculated using the following equation:

$$HQ = \frac{CADD\ (mg/kg\text{-}day)}{RfD\ (mg/kg\text{-}day)}$$

The target HQ is defined as an HQ of less than or equal to one (USEPA, 1989a). When the HQ is less than or equal to 1, the RfD has not been exceeded, and no adverse noncarcinogenic effects are expected. If the HQ is greater than 1, there may be a potential for adverse noncarcinogenic health effects to occur; however, the magnitude of the HQ cannot be directly equated to a probability or effect level.

The total Hazard Index (HI) is calculated for each exposure pathway by summing the HQs for each individual constituent. The total site HI is calculated for each potential receptor by summing the HIs for each pathway associated with the receptor. Where the total site HI is greater than 1 for any receptor, a more detailed evaluation of potential noncarcinogenic effects based on specific health or target endpoints (e.g., liver effects, neurotoxicity) is performed (USEPA, 1989a; IEPA, 1998). The target HI is 1 on a per target endpoint basis.

A summary of all HIs for each receptor group is presented in this section and compared to the USEPA's target HI of 1. Each COPC that causes an exceedance of the HI of 1 for a particular receptor and for a particular target endpoint is designated a COC. Both RME and MLE results are considered in the identification of COCs. RGs are calculated for each COC in Section 8.0.

6.3 Risk Characterization Results

The results of the risk characterization are presented below by receptor.

6.3.1 Indoor Industrial Worker

Potential carcinogenic risks for the RME scenario are presented in Table 6-1, and the potential HIs for the RME scenario are presented in Table 6-2. Risks and HIs for the MLE scenario are presented in Tables 6-15 and 6-16, respectively. The indoor industrial worker is assumed to be exposed to COPCs in groundwater via inhalation of constituents volatilizied into indoor air.

As indicated in Table 6-1, the potential risk for the indoor industrial worker (RME) is below or within the USEPA risk range of 10^{-4} to 10^{-6}. Table 6-15 indicates that the potential risks for the MLE scenario are below the USEPA risk range of 10^{-4} to 10^{-6}.

Table 6-2 indicates that the potential HIs for the indoor industrial worker (RME) are below the target HI of 1 in each area. Additionally, the HIs for the indoor industrial worker in the MLE scenario presented in Table 6-16 are below 1 for all areas.

6.3.2 Outdoor Industrial Worker

Potential carcinogenic risks for the RME scenario are presented in Table 6-3, and the potential HIs for the RME scenario are presented in Table 6-4. Risks and HIs for the MLE scenario are presented in Tables 6-17 and 6-18, respectively. The outdoor industrial worker is assumed to be exposed to COPCs in surface soil via incidental ingestion and dermal contact and inhalation of particulates, and to COPCs in groundwater via inhalation of constituents volatilized into outdoor air.

As indicated in Table 6-3, the potential risk for the outdoor industrial worker (RME) for all areas is below or within the USEPA risk range of 10^{-4} to 10^{-6}, with the exception of Site I where the potential carcinogenic risk for the outdoor industrial worker (RME) is 1.66E-04. The exceedance is due to potential ingestion and dermal contact exposure to 2,3,7,8-TCDD-TEQ in soil. Table 6-17 indicates that the potential risks for the MLE scenario for all areas are within or below the USEPA risk range of 10^{-4} to 10^{-6}.

Table 6-4 indicates that the potential HIs for the outdoor industrial worker (RME) for all areas are below the target HI of 1 in each area with the exception of Site I. The HI exceeds 1 in this area, due to potential ingestion and dermal contact exposure to PCBs in surface soil. The HIs for the outdoor industrial worker for the MLE scenario presented in Table 6-18 are below 1 for all areas.

6.3.3 Construction Worker

Potential carcinogenic risks for the RME scenario are presented in Table 6-5, and the potential HIs for the RME scenario are presented in Table 6-6. Risks and HIs for the MLE scenario are presented in Tables 6-19 and 6-20, respectively. The construction worker is assumed to be exposed to COPCs in surface and subsurface soil via incidental ingestion and dermal contact and inhalation of particulate matter in excavation dust, and to COPCs in groundwater exposed in an excavation via incidental ingestion and dermal contact and inhalation of constituents volatilized into excavation air.

As indicated in Table 6-5, the potential risk for the construction worker (RME) for all areas is below or within the USEPA risk range of 10^{-4} to 10^{-6}. Table 6-19 indicates that the potential risks for the MLE scenario are also below or within the USEPA risk range of 10^{-4} to 10^{-6}.

Table 6-6 indicates that the potential HIs for the construction worker (RME) are below the target HI of 1 in each area with the exception of Sites G, H and I. The HI for the construction worker for the MLE scenario presented in Table 6-20 is below 1 for all areas with the exception of Site H.

The RME HI exceeds 1 in Site G primarily due to potential inhalation exposure to benzene and naphthalene in excavation air. The RME HI exceeds 1 in Site H due to potential inhalation exposure to benzene, chloroform, and naphthalene in excavation air due to volatilization from standing groundwater. The MLG HI for Site H exceeds 1 primarily due to chloroform in excavation air, and secondarily due to benzene in excavation air. The HI exceeds 1 for the RME scenario in Site I primarily due to potential ingestion and dermal contact exposure to PCBs in soil.

Section 8.0 and Appendix R discuss the target endpoint analyses for the scenarios with total HI exceedances.

6.3.4 Trespassing Teen

Potential carcinogenic risks for the RME scenario are presented in Table 6-7, and the potential HIs for the RME scenario are presented in Table 6-8. Risks and HIs for the MLE scenario are presented in Tables 6-21 and 6-22, respectively. The trespassing teen is assumed to be exposed to COPCs in surface soil via incidental ingestion and dermal contact and inhalation of particulates, and to COPCs in groundwater via inhalation of constituents volatilized into outdoor air.

As indicated in Table 6-7, the potential risk for the trespassing teen (RME) is below or within the USEPA risk range of 10^{-4} to 10^{-6}. Table 6-21 indicates that the potential risks for the MLE scenario are also below or within the USEPA risk range of 10^{-4} to 10^{-6}.

Table 6-8 indicates that the potential HI for the trespassing teen (RME) is below the target HI of 1 in each area. The HIs for the trespassing teen in the MLE scenario presented in Table 6-22 are below 1 for all areas.

6.3.5 Recreational Teen

Potential carcinogenic risks for the RME scenario are presented in Table 6-9, and the potential HIs for the RME scenario are presented in Table 6-10. Risks and HIs for the MLE scenario are presented in Tables 6-23 and 6-24, respectively. The recreational teen is assumed to be exposed to COPCs in sediment (wading and swimming) in Dead Creek/Borrow Pit Lake via incidental ingestion and dermal contact.

As indicated in Table 6-9, the potential risk for the recreational teen (RME) is below the USEPA risk range of 10^{-4} to 10^{-6}. Table 6-23 indicates that the potential risks for the MLE scenario are also below the USEPA risk range of 10^{-4} to 10^{-6}.

Table 6-10 indicates that the potential HI for the recreational teen (RME) is below the target HI of 1. The HI for the recreational teen in the MLE scenario presented in Table 6-24 is also below 1.

6.3.6 Recreational Fisher

Potential carcinogenic risks for the RME scenario are presented in Table 6-11, and the potential HIs for the RME scenario are presented in Table 6-12. Risks and HIs for the MLE scenario are presented in Tables 6-25 and 6-26, respectively. The recreational fisher is assumed to be exposed to COPCs in sediment in Dead Creek/Borrow Pit Lake via incidental ingestion and dermal contact, and to COPCs in consumed fish fillet caught in the creek and/or lake.

As indicated in Table 6-11, the potential risk for the recreational fisher (RME) is within the USEPA risk range of 10^{-4} to 10^{-6}. Table 6-23 indicates that the potential risks for the MLE scenario are also within the USEPA risk range of 10^{-4} to 10^{-6}.

Table 6-12 indicates that the potential HI for the recreational fisher (RME) is below the target HI of 1. The HI for the recreational fisher in the MLE scenario presented in Table 6-26 is also below 1.

6.3.7 Residential Adult and Child

The resident is evaluated as a young child for a 6-year exposure duration and as an adult for a 24-year exposure duration, for a total exposure period of 30 years. Noncancer effects are evaluated for the residential child receptor, and potential carcinogenic effects are evaluated for the adult and child combined, as discussed in Section 5.0. Potential carcinogenic risks for the RME scenario are presented in Table 6-13, and the potential HIs for the RME scenario are presented in Table 6-14. Risks and HIs for the MLE scenario are presented in Tables 6-27 and 6-28, respectively. The residential receptors are assumed to be exposed to COPCs in surface soil via incidental ingestion and dermal contact and inhalation of particulates and ingestion of homegrown produce, and to COPCs in non-potable groundwater via incidental ingestion and dermal contact.

As indicated in Table 6-13, the potential risk for the residential receptor (adult and child combined) (RME) is below or within the USEPA risk range of 10^{-4} to 10^{-6} in all transects and Site N. Table 6-27 indicates that the potential risks for the MLE scenario are within the USEPA risk range of 10^{-4} to 10^{-6} for all areas.

Table 6-14 indicates that the potential HIs for the residential child (RME) are below the target HI of 1 in each area. The HIs for the residential child in the MLE scenario presented in Table 6-28 are also below 1 for all areas. The only COPC identified in groundwater in the residential area is lead. Potential exposures to lead are evaluated separately in Appendix Q, using USEPA biokinetic models. The results indicate that potential exposure to lead in groundwater does not present a health risk.

6.4 Soil to Groundwater Pathway Analysis

Analysis of the soil to groundwater pathway identified six COPCs. Five of these were common to the transect and site soils: beta-BHC (Transect 6 and Site L surface soil), dieldrin (Transect 5 and Site I surface soil), pentachlorophenol (all sites and transects) and selenium (Transect 3 and Sites H and L surface soil). Benzo(a)anthracene was also identified as a COPC in Transect 4 subsurface soil, and 4-chloroaniline was also identified as a COPC in Site I surface soil (see Tables 3-3 and 3-4).

In groundwater in the transect areas, dieldrin and beta-BHC were each detected once in a transect area groundwater sampling location (i.e., locations south of Site L). Both concentrations were below groundwater screening values. None of the remaining COPCs were detected in groundwater in this area.

In the site areas, dieldrin and selenium were not identified as COPCs in groundwater. The remaining soil to groundwater pathway COPCs were not identified as COCs in the risk assessment, i.e., did not pose direct contact risks that would cause an exceedence of the target risk range or hazard index. In addition, these soil to groundwater pathway COPCs were identified in surface soil; the shallow depth of surface soil in these areas is unlikely to serve as a significant concentration source of these COPCs to groundwater.

Therefore, none of the soil to groundwater COPCs are identified as COCs for this pathway in this risk assessment.

6.5 Uncertainty Analysis

Within any of the four steps of the human health risk assessment process, assumptions must be made due to a lack of absolute scientific knowledge. Some of the assumptions are supported by considerable scientific evidence, while others have less support. Every assumption introduces some degree of uncertainty into the risk assessment process. Regulatory risk assessment methodology requires that conservative assumptions be made throughout the risk assessment to ensure that public health is protected. Therefore, when all of the assumptions are combined, it is much more likely that risks are overestimated rather than underestimated.

The assumptions that introduce the greatest amount of uncertainty in this risk assessment are discussed in this section. They are discussed in qualitative terms, because for most of the assumptions there is not enough information to assign a numerical value to the uncertainty that can be factored into the calculation of risk.

6.5.1 Selection of Constituents of Potential Concern

In the Hazard Identification step, information on constituents detected at the site is combined with criteria quantifying their potential toxicity to obtain a subset of constituents for quantitative evaluation in the risk assessment, the COPCs. The goal is to include in the quantitative portion of the risk assessment those constituents that are the most toxic, prevalent, environmentally-persistent, and mobile. The selection of the COPCs forms the basis of the quantitative risk assessment.

Generally in the site characterization phase of the site assessment, knowledge of past and current land use is used to determine which analytical parameters are analyzed and what analytical methods are employed for the detection of constituents in the relevant environmental media at the site. However, for Sauget Area 1, the knowledge of past and current industrial practices was not used to limit the analyte list. Instead, the majority of environmental samples were analyzed for a full suite of constituents including VOCs, SVOCs, metals, cyanide, PCBs, pesticides, herbicides and dioxins, as detailed in Section 3.1.2.

In the Hazard Identification process, it is assumed that only those constituents detected are actually present at the site. However, it is possible that constituents not on the analyte list may be present at the site. Should this be the case, site risks may be underestimated depending on the nature of the constituents not included in the sample analyses. However, the full suite of USEPA analyte lists were used and are as inclusive as possible of constituents used in industry that are of potential public health concern. Therefore, it is unlikely that constituents not included on the analyte list would be present at the site at concentrations that would pose a risk to public health.

A subset of constituents detected at a site is generally selected for quantitative analysis for several reasons. Some constituents detected at a site may be naturally occurring and not related to site use. Other constituents may be present at concentrations that can be assumed with reasonable assurance not to pose a risk to human health. A review of the results of risk assessments demonstrate that in most cases risks are attributable only to one or a few constituents, and that many of the constituents quantitatively evaluated do not contribute significantly to total risk estimates (USEPA, 1993a). The screening process is conducted to identify the COPCs that may contribute the greatest to potential risk. The screening process used here is conservative. Although the excluded constituents may pose a finite level of risk, that risk would contribute negligibly to the total site risk. Therefore, not evaluating the excluded constituents will not measurably affect the numerical estimates of hazard or risk, and thus not affect remedial decision-making at the site.

In comparison with the list of constituents analyzed in each environmental sample (approximately 180 analytes), relatively few constituents were detected in transect and site soils, and of these, relatively few COPCs (a total of seven) were identified for quantitative evaluation in the risk assessment for the transect soils. The COPCs identified were PAHs, arsenic and dieldrin. PAHs and arsenic were also identified as COPCs in site soils (a total of 6 constituents were identified as COPCs in site soils). As discussed in Section 3.3.1.4, the levels of PAHs and arsenic are likely consistent with natural and anthropogenic background, i.e., the detected concentrations would not be expected to be very different in other areas of Sauget and Cahokia, or in other areas in the state of Illinois. Dieldrin is a pesticide that has been in common usage; it was identified as a COPC in a single transect (Transect 5) where it was detected in 2 of 9 samples, the concentration of only one of these samples exceeded the screening criteria. The presence of dieldrin may be due to past agricultural practices in the area. Therefore, these COPCs, although included in the risk assessment, may not necessarily be related to specific site-related releases.

6.5.2 Toxicity Assessment

The purpose of the toxicity assessment is to identify the types of adverse health effects a constituent may potentially cause and to define the relationship between the dose of a constituent and the likelihood or magnitude of an adverse effect (response). Risk assessment methodologies typically divide potential health effects of concern into two general categories: effects with a threshold (noncarcinogenic) and effects assumed to be without a threshold (potentially carcinogenic). Toxicity assessments for both of these types of effects share many of the same sources of uncertainty. To compensate for these uncertainties, USEPA has developed the reference doses (RfDs) and cancer slope factors (CSF) that are biased to overestimate rather than under-estimate human health risks. Several of the more important sources of uncertainty and the resulting biases are discussed below.

6.5.2.1 Animal-to-Human Extrapolation in Noncarcinogenic Dose-Response Evaluation

For many constituents, animal studies provide the only reliable information on which to base an estimate of adverse human health effects. Extrapolation from animals to humans introduces a great deal of uncertainty into the risk characterization. In most instances, it is not known how differently a human may react to the constituent compared to the animal species used to test the constituent. If a constituent's fate and the mechanisms by which it causes adverse effects are known in both animals and humans, uncertainty is reduced. When the fate and mechanism for the constituent are unknown, uncertainty increases.

The procedures used to extrapolate from animals to humans involve conservative assumptions and incorporate uncertainty factors such that overestimation of effects in humans is more likely than underestimation. When data are available from several species, the lowest dose that elicits effects in the most sensitive species is used for the calculation of the reference dose (RfD). To this dose are applied uncertainty factors, generally of 1 to 10 each, to account for intraspecies variability, interspecies variability, study duration, and/or extrapolation of a low effect level to a no effect level. Thus, most reference doses used in risk assessment are 100- to 10,000-fold lower than the lowest effect level found in laboratory animals.

Nevertheless, because the fate of a constituent can differ in animals and humans, it is possible that animal experiments will not reveal an adverse effect that would manifest itself in humans. This can result in an underestimation of the effects in humans. The opposite may also be true: effects observed in animals may not be observed in humans, resulting in an overestimation of potential adverse human health effects.

6.5.2.2 Evaluation of Carcinogenic Dose-Response

Significant uncertainties exist in estimating dose-response relationships for potential carcinogens. These are due to experimental and epidemiologic variability, as well as uncertainty in extrapolating both from animals to humans and from high to low doses. Three major issues affect the validity of toxicity assessments used to estimate potential excess lifetime cancer risks: (1) the selection of a study (i.e., data set, animal species, matrix the constituent is administered in) upon which to base the calculations, (2) the conversion of the animal dose used to an equivalent human dose, and (3) the mathematical model used to extrapolate from experimental observations at high doses to the very low doses potentially encountered at the site.

Study Selection

Study selection involves the identification of a data set (experimental species and specific study) that provides sufficient, well-documented dose-response information to enable the derivation of a valid cancer slope factor (CSF). Human data (e.g., from epidemiological studies) are preferable to animal data, although adequate human data sets are relatively uncommon. Therefore, it is often necessary to seek dose-response information from a laboratory species, ideally one that biologically resembles humans (e.g., with respect to metabolism, physiology, and pharmacokinetics), and where the route of administration is similar to the expected mode of human exposure (e.g., inhalation and ingestion). When multiple valid studies are available, the USEPA generally bases CSFs on the one study and site that show the most significant increase in tumor incidence with increasing dose. In some cases this selection is done in spite of significant decreases with increasing dose of tumor incidence in other organs and total tumor incidence. Consequently, the current study selection criteria are likely to lead to overestimation of potential cancer risks in humans.

Interspecies Dose Conversion

The USEPA derivation of human equivalent doses by conversion of doses administered to experimental animals requires the assumption that humans and animals are equally sensitive to the toxic effects of a substance, if the same dose per unit body surface area is absorbed by each species. Although such an assumption may hold for direct-acting genotoxicants, it is not necessarily applicable to many indirect acting carcinogens and likely overestimates potential risk by a factor of 6 to 12 depending on the study species (USEPA, 1992e). Further assumptions for dose conversions involve standardized scaling factors to account for differences between humans and experimental animals with respect to life span, body size, breathing rates, and other physiological parameters. In addition, evaluation of risks associated with one route of administration (e.g., inhalation) when tests in animals involve a different route (e.g., ingestion) requires additional assumptions with corresponding additional uncertainties. Although USEPA has formally changed its default position for scaling animal data to humans from a per surface area to a per body weight basis (USEPA, 1992e), changes to existing CSF will only be made when the USEPA commits to a formal review of a constituent's dose-response profile, and as of this writing, few have been incorporated.

High-to-Low Dose Extrapolation

The concentration of constituents to which people are potentially exposed at industrial sites is usually much lower than the levels used in the studies from which dose-response relationships are developed. Estimating potential health effects at such sites, therefore, requires the use of models that allow extrapolation of health effects from high experimental doses in animals to low environmental doses. These models are generally statistical in character and have little or no biological basis. Thus the use of a model for dose extrapolation introduces uncertainty in the dose-response estimate. In addition, these models contain assumptions that may also introduce a large amount of uncertainty. Generally the models have been developed to err on the side of over-estimating rather than under-estimating potential health risks.

The USEPA CSFs are derived using the upper 95% confidence limit of the slope predicted by the linearized multi-stage (LMS) model used to extrapolate low dose risk from high dose experimental data. USEPA recognizes that this method produces very conservative risk estimates, and that other mathematical models exist. USEPA states that the upper-bound estimate generated by the LMS model leads to a plausible upper limit to the risk that is consistent with some of the proposed mechanisms of carcinogenesis. The true risk, however, is unknown and may be as low as zero. The LMS model is very conservative as it assumes strict linearity between the lowest dose that produced an effect and zero dose. However, the body has many mechanisms to detoxify constituents, especially at low doses, and many mechanisms to repair damages if they should occur. Therefore, many scientists believe that most constituents can cause cancer only above a "threshold" dose. This phenomenon of a threshold for carcinogenic activity has recently been demonstrated for chloroform (as reviewed in Bradley, 1996).

An established policy does not yet exist for using "most likely" or "best" estimates of risk within the range of uncertainty defined by the upper- and lower-limit estimates defined by the models. USEPA has published a draft version of its cancer guidelines (USEPA, 1996c). These draft guidelines allow for much greater use of mechanistic data, however, the guidelines have not yet been finalized and it will take time before USEPA can apply the new methodology to existing CSF.

6.5.3 Exposure Assessment

Exposure assessment consists of three basic steps: 1) development of exposure scenarios, (2) estimation of exposure point concentrations, and 3) estimation of human dose.

Exposure Scenarios

Exposure scenarios in a risk assessment are selected to be representative of potential exposures to COPCs in media that may be experienced by human receptors based on current and reasonably foreseeable land use. These exposure scenarios are developed for a hypothetical receptor, but one that would represent the reasonable maximal exposure (RME) scenario for the site. Therefore, exposure levels are assumed for these receptors, i.e., residential, commercial/industrial, recreational, that are much greater than expected to occur in an actual population. The use of the most likely exposure (MLE) scenarios provides an estimate of exposures more likely to represent average exposures. The MLE risk estimates are used to put the RME risk estimates into context.

Estimation of Exposure Point Concentrations

Sample Statistics. Exposure to COPCs at the site is best estimated by the use of the arithmetic mean concentration of a COPC in each medium. Because of the uncertainty associated with estimating the true average concentration at a site, the USEPA has required the use of the 95% UCL on the arithmetic mean as the exposure point concentration (EPC) (USEPA, 1992a). Therefore, this is a very conservative estimate of the true arithmetic mean. RME EPCs in this risk assessment represent the lower of the maximum detected concentration or the 95% UCL on the mean (USEPA, 1992a). The appropriate UCL is selected based on the results of a Shapiro-Wilk Test for Normality, the results of which indicate whether a data set is more likely to be normally or lognormally distributed. Uncertainty can arise if the test results show the data set to be normally distributed when it is actually lognormally distributed, or vice-versa. This source of uncertainty, however, would not lead to large differences in the calculated dose for a given receptor, based on a comparison of the two UCL values calculated for this risk assessment. Again to provide context, the MLE calculations have used the arithmetic mean concentration, not the upper bound, as the EPC.

Sample Location. In addition, the data used to calculate the EPCs are assumed to be representative of general site conditions. Sample locations in the sites and transects were identified to be as representative of site conditions as possible.

Environmental Degradation. Finally, it is assumed that the EPCs calculated in the risk assessment based on current site conditions remain constant for the assumed exposure duration – for an industrial or residential scenario this is a period of 25 to 30 years. However, it is well known in the scientific community that constituents in the environment are subject to natural attenuation and biodegradation processes. Organic constituents are naturally degraded in the environment by a variety of processes (i.e., photodegradation, microbial activity, hydrolysis, etc.). USEPA has recognized the validity and utility of natural attenuation and biodegradation as a remedial option and has recently published guidance for its site-specific implementation (USEPA, 1997d). Environmental half-lives vary for specific constituents based on environmental conditions (i.e., presence of bacteria, pH, exposures to sunlight and oxygen), and there are respected literature sources of such information. However, environmental degradation is not typically accounted for in the calculation of risks for the site. This has likely resulted in an over-estimation of site risks.

Exposure Assumptions

When estimating potential human doses (i.e., intakes) from potential exposure to various media containing COPCs, several assumptions are made. Uncertainty may exist, for example, in assumptions concerning rates of ingestion, frequency and duration of exposure, and bioavailability of the constituents in the medium. Typically, when limited information is available to establish these assumptions, a conservative (i.e., health-protective) estimate of potential exposure is employed. Default exposure assumptions recommended by the USEPA are intended to be conservative and representative of an individual who consistently and frequently contacts environmental media at a site, a scenario that rarely occurs. Most individuals will contact media at non-site locations, while the risk assessment assumes that all exposure to environmental media will occur at the site. Moreover, it is often assumed that contact with environmental media occurs in the areas having the highest constituent concentrations for the entire exposure frequency/duration used in the risk assessment, due to both statistical handling of the data and the original sampling plan.

The assumptions regarding exposure frequency and duration are very conservative. For example, while the agency default for working tenure is 25 years, the average occupational tenure for an industrial/commercial worker is 4.2 years. The use of conservative assumptions is likely to lead to an overestimate of potential risk.

Another conservative assumption used in the risk assessment has been the use of an adult produce consumption rate of 454 g per day, which is equivalent to 1 pound of homegrown produce per day. This value was obtained from the EFH (USEPA, 1997a), and represents an upper bound ingestion rate, especially considering that this rate applies to a year long (365 day per year) exposure. The methodology for evaluating the residential produce consumption pathway was obtained from a USEPA protocol (USEPA, 1998d). In this protocol, a 25% adjustment factor has been applied to the ingestion factor obtained from the EFH to represent the homegrown produce ingestion, an indication that the ingestion rates provided in the EFH are very high. Therefore, the produce consumption rates used in the Sauget Area 1 risk assessment are very conservative and likely overestimate risk via this pathway.

6.5.4 Risk Characterization

The potential risk of adverse human health effects is characterized based on estimated potential exposures and potential dose-response relationships. Three areas of uncertainty are introduced in this phase of the risk assessment: the evaluation of potential exposure to multiple constituents, the combination of upper-bound exposure estimates with upper-bound toxicity estimates, and the risk to sensitive populations.

6.5.5 Risk from Multiple Constituents

Once potential exposure to and potential risk from each COPC is estimated, the total upper-bound potential risk posed by the site is determined by combining the estimated potential health risk from each of the COPC. Presently, potential carcinogenic effects are added unless evidence exists indicating that the COPC interact synergistically (a combined effect that is greater than a simple addition of potential individual effects) or antagonistically (a combined effect that is less than a simple addition of potential individual effects) with each other. For most combinations of constituents, little if any evidence of interaction is available. Therefore, additivity is assumed. Although the IEPA TACO program provides a listing of groups of constituents that are considered to be additive in their carcinogenic potential, the USEPA approach of assuming additivity across all constituents was used in this risk assessment.

For noncarcinogenic effects, the Hazard Index (HI) should only be summed for constituents that have the same or similar toxic endpoints (USEPA, 1989a). The toxic endpoint is defined as the most sensitive noncarcinogenic health effect used to derive the RfD or other suitable toxicity value (USEPA, 1989a). Again, there is little evidence to suggest whether those COPCs associated with a common toxicity endpoint are additive, synergistic, antagonistic, or independent in terms of mechanism of action. Whether assuming additivity leads to an underestimation or overestimation of risk is unknown.

Combination of Several Upper-Bound Assumptions

Generally, the goal of a risk assessment is to estimate an upper-bound, but reasonable, potential exposure and risk. Most of the assumptions about exposure and toxicity used in this evaluation are representative of statistical upper-bounds or even maxima for each parameter. The result of combining several such upper-bound assumptions is that the final estimate of potential exposure or potential risk is extremely conservative (health-protective).

This is best illustrated by a simple example. Assume that potential risk depends upon three variables (soil consumption rate, COPC concentration in soil and CSF). The mean, upper 95% bound and maximum are available for each variable.

One way to generate a conservative estimate of potential risk is to multiply the upper 95% bounds of the three parameters in this example. Doing so assumes that the 5% of the people who are most sensitive to the potential carcinogenic effects of a COPC will also ingest soil at a rate that exceeds the rate for 95% of the population, and that all the soil these people eat will have a compound concentration that exceeds the concentration in 95% of the soil on site. The consequence of these assumptions is that the estimated potential risk is representative of 0.0125% of the population (0.05 x 0.05 x 0.05 = 0.000125 x 100 = 0.0125%). Put another way, these assumptions overestimate risks for 9,999 out 10,000 people, or 99.99% of the population. Thus, the majority of people will have a much lower level of potential risk. The very conservative nature of the potential risks estimated by the risk assessment process is not generally recognized. In reality, the estimates are more conservative than outlined above, because usually more than three upper 95% assumptions are used to estimate potential risk(s).

Alternatively, if a single upper 95% assumption of the cancer slope factor is combined with average (50th percentile) assumptions for soil concentration and soil ingestion rate, the resulting estimates of potential risk still overpredict risk for 99% of the potentially exposed population. This is a conservative and health protective approach that substantially overestimates the "average" level and even the reasonable maximum level of potential risk.

The risk assessment approach used here employed upper 95% bounds or maxima for most RME exposure and toxicity assumptions. Thus, it produces estimates of potential risk two to three orders of magnitude greater than the risk experienced by the average member of the potentially exposed populations. The MLE scenarios have used average estimates of exposure where possible, but still use the conservative toxicity values, thus even the MLE risk estimates are likely to overestimate total risk.

6.5.6 Risk to Sensitive Populations

The health risks estimated in the risk characterization generally apply to the receptors whose activities and locations were described in the exposure assessment. Some people will always be more sensitive than the average person and, therefore, will be at greater risk. Dose-response values used to calculate risk, however, are frequently derived to account for additional sensitivity of subpopulations (e.g., the uncertainty factor of 10 used to account for intraspecies differences). Therefore, it is unlikely that this source of uncertainty contributes significantly to the overall uncertainty of the risk assessment.

6.5.7 Summary of Sources of Uncertainty in Human Health Risk Assessment

The large number of assumptions made in the risk characterization introduces uncertainty in the results. While this could potentially lead to underestimates of potential risk, the use of numerous conservative (i.e., protective of human health) assumptions, as was done here, results in overestimates of potential risks. Any one person's potential exposure and subsequent risk are influenced by all the parameters mentioned above and will vary on a case-by-case basis. Despite inevitable uncertainties associated with the steps used to derive potential risks, the use of numerous health-protective assumptions will most likely lead to a very large overestimate of potential risks from the site. Moreover, when evaluating risk assessment results, it is important to put the risks into perspective. For example, the background rate of cancer in the US is approximately 2,500 for a population of 10,000 people (Landis, et al., 1998). The results of the risk assessment must be carefully interpreted considering the uncertainty and conservatism associated with the analysis, especially where site management decisions are made.

TABLE 6-1
TOTAL POTENTIAL CARCINOGENIC RISK
INDOOR WORKER - RME
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Site G Groundwater Inhalation Risk	Site H Groundwater Inhalation Risk	Site I Groundwater Inhalation Risk	Site L Groundwater Inhalation Risk
1,1,2,2-Tetrachloroethane	NC	5.26E-09	NC	NC
4-Methyl-2-pentanone	NC	NC	NC	NC
Benzene	6.82E-07	4.24E-07	1.37E-07	8.20E-09
Chlorobenzene	NC	NC	NC	NC
Chloroform	NC	4.49E-07	NC	7.94E-08
Ethylbenzene	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC
Tetrachloroethene	1.69E-08	NC	NC	NC
Toluene	NC	NC	NC	NC
Trichloroethene	4.24E-08	1.08E-08	3.78E-08	NC
Vinyl chloride	8.06E-08	NC	1.90E-06	NC
Total	8.22E-07	8.89E-07	2.08E-06	8.76E-08

Notes:
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
RME - Reasonable Maximum Exposure.

TABLE 6-2
TOTAL POTENTIAL HAZARD INDEX
INDOOR WORKER - RME
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Site G Groundwater Inhalation HQ	Site H Groundwater Inhalation HQ	Site I Groundwater Inhalation HQ	Site L Groundwater Inhalation HQ
1,1,2,2-Tetrachloroethane	NC	NC	NC	NC
4-Methyl-2-pentanone	NC	NC	NC	NC
Benzene	1.46E-01	9.06E-02	2.93E-02	1.75E-03
Chlorobenzene	2.96E-02	3.09E-02	5.94E-02	NC
Chloroform	NC	2.75E-01	NC	4.86E-02
Ethylbenzene	NC	4.34E-04	NC	NC
Naphthalene	1.48E-02	1.69E-02	NC	NC
Tetrachloroethene	2.08E-04	NC	NC	NC
Toluene	5.16E-03	NC	NC	NC
Trichloroethene	NC	NC	NC	NC
Vinyl chloride	5.13E-04	NC	1.21E-02	NC
Total HI	1.96E-01	4.14E-01	1.01E-01	5.04E-02

Notes:
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
RME - Reasonable Maximum Exposure.

TABLE 6-3
TOTAL POTENTIAL CARCINOGENIC RISK
OUTDOOR WORKER - RME
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Transect 3			Transect 4			Transect 6			Transect 7		
	Surface Soil		Total	Surface Soil		Total	Surface Soil		Total	Surface Soil		Total
Constituent	Ing/Derm.	Inhalation	Risk	Ing/Derm.	Inhalation	Risk	Ing/Derm.	Inhalation	Risk	Ing/Derm.	Inhalation	Risk
1,1,2,2-Tetrachloroethane	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Methyl-2-pentanone	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Arsenic	NC	NC	NC	NC	NC	NC	NC	NC	NC	8.99E-07	6.45E-09	9.06E-07
Benzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	7.98E-08	2.32E-11	7.98E-08	1.07E-06	3.12E-10	1.07E-06	1.11E-06	3.21E-10	1.11E-06	6.45E-07	1.87E-10	6.45E-07
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chlorobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chloroform	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Copper	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	7.06E-08	2.05E-11	7.06E-08	NC	NC	NC	NC	NC	NC
Dieldrin	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Tetrachloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total 2,3,7,8-TCDD TEQ	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total PCBs	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Trichloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Vinyl chloride	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Zinc	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total	7.98E-08	2.32E-11	7.98E-08	1.15E-06	3.32E-10	1.15E-06	1.11E-06	3.21E-10	1.11E-06	1.54E-06	6.64E-09	1.55E-06

Notes:
Ing/Derm - Ingestion/Dermal Contact.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
RME - Reasonable Maximum Exposure.

TABLE 6-3
TOTAL POTENTIAL CARCINOGENIC RISK
OUTDOOR WORKER - RME
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Site G	Site H				Site I				Site L			
	Groundwater	Surface Soil		Groundwater	Total	Surface Soil		Groundwater	Total	Surface Soil		Groundwater	Total
Constituent	Inhalation Risk	Ing/Derm.	Inhalation	Inhalation	Risk	Ing/Derm.	Inhalation	Inhalation	Risk	Ing/Derm.	Inhalation	Inhalation	Risk
1,1,2,2-Tetrachloroethane	NC	NC	NC	1.73E-09	1.73E-09	NC	NC	NC	NC	NC	NC	NC	NC
4-Methyl-2-pentanone	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Arsenic	NC	3.84E-06	4.13E-08	NC	3.88E-06	NC	NC	NC	NC	2.22E-06	1.59E-08	NC	2.24E-06
Benzene	3.66E-08	NC	NC	3.66E-08	3.66E-08	NC	NC	3.14E-08	3.14E-08	NC	NC	2.62E-10	2.62E-10
Benzo(a)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	NC	NC	NC	NC	6.75E-07	3.84E-10	NC	6.76E-07	2.15E-06	6.23E-10	NC	2.15E-06
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chlorobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chloroform	NC	NC	NC	4.52E-08	4.52E-08	NC	NC	NC	NC	NC	NC	2.53E-09	2.53E-09
Copper	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	3.99E-07	1.16E-10	NC	3.99E-07
Dieldrin	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Tetrachloroethene	1.02E-09	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total 2,3,7,8-TCDD TEQ	NC	1.47E-05	8.40E-09	NC	1.47E-05	1.35E-04	1.01E-07	NC	1.36E-04	NC	NC	NC	NC
Total PCBs	NC	3.57E-07	1.31E-10	NC	3.57E-07	2.85E-05	1.37E-08	NC	2.85E-05	2.51E-07	6.15E-11	NC	2.51E-07
Trichloroethene	3.47E-09	NC	NC	1.43E-09	1.43E-09	NC	NC	1.31E-08	1.31E-08	NC	NC	NC	NC
Vinyl chloride	1.20E-08	NC	NC	NC	NC	NC	NC	1.20E-06	1.20E-06	NC	NC	NC	NC
Zinc	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total	5.32E-08	1.89E-05	4.99E-08	8.50E-08	1.90E-05	1.65E-04	1.15E-07	1.25E-06	1.66E-04	5.02E-06	1.67E-08	2.79E-09	5.04E-06

Notes:
Ing/Derm - Ingestion/Dermal Contact.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
RME - Reasonable Maximum Exposure.

TABLE 6-4
TOTAL POTENTIAL HAZARD INDEX
OUTDOOR WORKER - RME
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Transect 3			Transect 4			Transect 6			Transect 7		
	Surface Soil		Total	Surface Soil		Total	Surface Soil		Total	Surface Soil		Total
Constituent	Ing/Derm.	Inhalation	HQ	Ing/Derm.	Inhalation	HQ	Ing/Derm.	Inhalation	HQ	Ing/Derm.	Inhalation	HQ
1,1,2,2-Tetrachloroethane	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Methyl-2-pentanone	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Arsenic	NC	NC	NC	NC	NC	NC	NC	NC	NC	5.59E-03	NC	5.59E-03
Benzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chlorobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chloroform	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Copper	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dieldrin	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Tetrachloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total 2,3,7,8-TCDD TEQ	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total PCBs	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Trichloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Vinyl chloride	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Zinc	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total HI	NC	NC	NC	NC	NC	NC	NC	NC	NC	5.59E-03	NC	5.59E-03

Notes:
Ing/Derm - Ingestion/Dermal Contact.
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
RME - Reasonable Maximum Exposure.

TABLE 6-4
TOTAL POTENTIAL HAZARD INDEX
OUTDOOR WORKER - RME
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Site G	Site H				Site I				Site L			
	Groundwater	Surface Soil		Groundwater	Total	Surface Soil		Groundwater	Total	Surface Soil		Groundwater	Total
Constituent	Inhalation HQ	Ing/Derm.	Inhalation	Inhalation	HQ	Ing/Derm.	Inhalation	Inhalation	HQ	Ing/Derm.	Inhalation	Inhalation	HQ
1,1,2,2-Tetrachloroethane	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Methyl-2-pentanone	3.96E-05	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Arsenic	NC	2.39E-02	NC	NC	2.39E-02	NC	NC	NC	NC	1.38E-02	NC	NC	1.38E-02
Benzene	7.84E-03	NC	NC	7.84E-03	7.84E-03	NC	NC	6.72E-03	6.72E-03	NC	NC	5.60E-05	5.60E-05
Benzo(a)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chlorobenzene	1.58E-03	NC	NC	2.67E-03	2.67E-03	NC	NC	1.35E-02	1.35E-02	NC	NC	NC	NC
Chloroform	NC	NC	NC	2.77E-02	2.77E-02	NC	NC	NC	NC	NC	NC	1.55E-03	1.55E-03
Copper	NC	NC	NC	NC	NC	1.31E-01	NC	NC	1.31E-01	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dieldrin	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	3.99E-05	3.99E-05	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	7.66E-04	NC	NC	1.44E-03	1.44E-03	NC	NC	NC	NC	NC	NC	NC	NC
Tetrachloroethene	1.25E-05	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Toluene	2.84E-04	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total 2,3,7,8-TCDD TEQ	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total PCBs	NC	2.50E-02	NC	NC	2.50E-02	1.99E+00	NC	NC	1.99E+00	1.76E-02	NC	NC	1.76E-02
Trichloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Vinyl chloride	7.66E-05	NC	NC	NC	NC	NC	NC	7.66E-03	7.66E-03	NC	NC	NC	NC
Zinc	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total HI	1.06E-02	4.89E-02	NC	3.97E-02	8.85E-02	2.12E+00	NC	2.79E-02	2.15E+00	3.14E-02	NC	1.61E-03	3.30E-02

Notes:
Ing/Derm - Ingestion/Dermal Contact.
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
RME - Reasonable Maximum Exposure.

TABLE 6-5
TOTAL POTENTIAL CARCINOGENIC RISK
CONSTRUCTION WORKER - RME
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Transect 3			Transect 4			Transect 6		
	Surface Soil		Total	Surface Soil		Total	Surface Soil		Total
	Ing/Derm.	Inhalation	Risk	Ing/Derm.	Inhalation	Risk	Ing/Derm.	Inhalation	Risk
1,1,2,2-Tetrachloroethane	NC	NC	NC	NC	NC	NC	NC	NC	NC
1,4-Dichlorobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
2,4,5-TP (Silvex)	NC	NC	NC	NC	NC	NC	NC	NC	NC
2,4,6-Trichlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC
2,4-Dichlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Chlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Nitroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC
3-Methylphenol/4-Methylphenol	NC	NC	NC	NC	NC	NC	NC	NC	NC
4,4-DDE	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Chloroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Methyl-2-pentanone	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Nitroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC
alpha-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Antimony	NC	NC	NC	NC	NC	NC	NC	NC	NC
Arsenic	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	NC	NC	4.02E-09	4.91E-11	4.06E-09	NC	NC	NC
Benzo(a)pyrene	1.77E-09	2.16E-11	1.79E-09	2.38E-08	2.91E-10	2.41E-08	2.45E-08	3.00E-10	2.48E-08
Benzo(b)fluoranthene	NC	NC	NC	2.25E-09	2.75E-11	2.27E-09	NC	NC	NC
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC
beta-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Cadmium	NC	NC	NC	NC	NC	NC	NC	NC	NC
Carbazole	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chlorobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chloroform	NC	NC	NC	NC	NC	NC	NC	NC	NC
Cis/Trans-1,2-Dichloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Copper	NC	NC	NC	NC	NC	NC	NC	NC	NC
delta-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	3.54E-09	4.33E-11	3.58E-09	NC	NC	NC
Dieldrin	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Heptachlor	NC	NC	NC	NC	NC	NC	NC	NC	NC
Heptachlor epoxide	NC	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Lead	NC	NC	NC	NC	NC	NC	NC	NC	NC
Molybdenum	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nickel	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nitrobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pentachlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenol	NC	NC	NC	NC	NC	NC	NC	NC	NC
Tetrachloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total 2,3,7,8-TCDD TEQ	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total PCBs	NC	NC	NC	NC	NC	NC	NC	NC	NC
Trichloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Vanadium	NC	NC	NC	NC	NC	NC	NC	NC	NC
Vinyl chloride	NC	NC	NC	NC	NC	NC	NC	NC	NC
Zinc	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total Risk	1.77E-09	2.16E-11	1.79E-09	3.36E-08	4.11E-10	3.40E-08	2.45E-08	3.00E-10	2.48E-08

Notes:
ing/derm - Ingestion/Dermal.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
RME - Reasonable Maximum Exposure.

TABLE 6-5
TOTAL POTENTIAL CARCINOGENIC RISK
CONSTRUCTION WORKER - RME
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Transect 7			Site G			Site H				
	Surface Soil		Total	Groundwater		Total	Surface Soil		Groundwater		Total
Constituent	Ing/Derm.	Inhalation	Risk	Ing/Derm.	Inhalation	Risk	Ing/Derm.	Inhalation	Ing/Derm.	Inhalation	Risk
1,1,2,2-Tetrachloroethane	NC	NC	NC	NC	NC	NC	NC	NC	1.57E-10	1.27E-08	1.29E-08
1,4-Dichlorobenzene	NC	NC	NC	8.06E-09	NC	8.06E-09	NC	NC	2.69E-08	NC	2.69E-08
2,4,5-TP (Silvex)	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2,4,6-Trichlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	2.59E-09	NC	2.59E-09
2,4-Dichlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Chlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Nitroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
3-Methylphenol/4-Methylphenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4,4-DDE	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Chloroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Methyl-2-pentanone	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Nitroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
alpha-BHC	NC	NC	NC	9.98E-09	NC	9.98E-09	NC	NC	3.45E-10	NC	3.45E-10
Antimony	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Arsenic	1.54E-08	6.03E-09	2.14E-08	NC	NC	NC	6.58E-08	2.58E-08	1.93E-08	NC	1.11E-07
Benzene	NC	NC	NC	1.64E-08	1.78E-07	1.94E-07	NC	NC	1.62E-08	1.75E-07	1.91E-07
Benzo(a)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	1.43E-08	1.75E-10	1.45E-08	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
beta-BHC	NC	NC	NC	7.06E-11	NC	7.06E-11	NC	NC	NC	NC	NC
Cadmium	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Carbazole	NC	NC	NC	NC	NC	NC	NC	NC	5.26E-11	NC	5.26E-1
Chlorobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chloroform	NC	NC	NC	NC	NC	NC	NC	NC	1.68E-10	1.38E-07	1.39E-07
Cis/Trans-1,2-Dichloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Copper	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
delta-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dieldrin	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Heptachlor	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Heptachlor epoxide	NC	NC	NC	NC	NC	NC	NC	NC	3.11E-09	NC	3.11E-09
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Lead	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Molybdenum	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nickel	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nitrobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pentachlorophenol	NC	NC	NC	9.73E-07	NC	9.73E-07	NC	NC	2.42E-06	NC	2.42E-06
Phenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Tetrachloroethene	NC	NC	NC	2.72E-09	1.83E-09	4.56E-09	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total 2,3,7,8-TCDD TEQ	NC	NC	NC	8.89E-06	NC	8.89E-06	3.56E-07	5.23E-09	2.26E-07	NC	5.87E-07
Total PCBs	NC	NC	NC	NC	NC	NC	7.37E-09	8.16E-11	NC	NC	7.45E-09
Trichloroethene	NC	NC	NC	2.40E-10	3.51E-08	3.54E-08	NC	NC	5.93E-11	8.69E-09	8 75E-09
Vanadium	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Vinyl chloride	NC	NC	NC	1.62E-09	4.46E-09	6.08E-09	NC	NC	NC	NC	NC
Zinc	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total Risk	2.97E-08	6.21E-09	3.59E-08	9.90E-06	2.19E-07	1.01E-05	4.30E-07	3.11E-08	2.71E-06	3.35E-07	3.51E-06

Notes:
ing/derm - Ingestion/Dermal.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
RME - Reasonable Maximum Exposure.

TABLE 6-5
TOTAL POTENTIAL CARCINOGENIC RISK
CONSTRUCTION WORKER - RME
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Site I					Site L				
	Surface Soil		Groundwater		Total	Surface Soil		Groundwater		Total
Constituent	Ing/Derm.	Inhalation	Ing/Derm.	Inhalation	Risk	Ing/Derm.	Inhalation	Ing/Derm.	Inhalation	Risk
1,1,2,2-Tetrachloroethane	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
1,4-Dichlorobenzene	NC	NC	1.09E-07	NC	1.09E-07	NC	NC	NC	NC	NC
2,4,5-TP (Silvex)	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2,4,6-Trichlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2,4-Dichlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Chlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Nitroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
3-Methylphenol/4-Methylphenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4,4-DDE	NC	NC	5.62E-10	NC	5.62E-10	NC	NC	NC	NC	NC
4-Chloroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Methyl-2-pentanone	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Nitroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
alpha-BHC	NC	NC	1.24E-09	NC	1.24E-09	NC	NC	NC	NC	NC
Antimony	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Arsenic	NC	NC	NC	NC	NC	3.80E-08	1.49E-08	2.00E-07	NC	2.53E-07
Benzene	NC	NC	4.68E-09	5.06E-08	5.53E-08	NC	NC	5.70E-10	4.10E-09	4.67E-09
Benzo(a)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	1.50E-08	1.83E-10	NC	NC	1.52E-08	4.76E-08	5.82E-10	NC	NC	4.82E-08
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	NC	3.27E-10	NC	3.27E-10	NC	NC	NC	NC	NC
beta-BHC	NC	NC	9.80E-11	NC	9.80E-11	NC	NC	NC	NC	NC
Cadmium	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Carbazole	NC	NC	1.49E-10	NC	1.49E-10	NC	NC	NC	NC	NC
Chlorobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chloroform	NC	NC	NC	NC	NC	NC	NC	9.00E-11	4.95E-08	4.96E-08
Cis/Trans-1,2-Dichloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Copper	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
delta-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	8.85E-09	1.08E-10	NC	NC	8.96E-09
Dieldrin	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Heptachlor	NC	NC	4.37E-10	NC	4.37E-10	NC	NC	NC	NC	NC
Heptachlor epoxide	NC	NC	1.98E-09	NC	1.98E-09	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Lead	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Molybdenum	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nickel	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nitrobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pentachlorophenol	NC	NC	1.22E-07	NC	1.22E-07	NC	NC	NC	NC	NC
Phenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Tetrachloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total 2,3,7,8-TCDD TEQ	3.29E-06	4.83E-08	4.55E-06	NC	7.89E-06	NC	NC	NC	NC	NC
Total PCBs	5.88E-07	6.51E-09	2.86E-08	NC	6.23E-07	5.19E-09	5.74E-11	NC	NC	5.24E-09
Trichloroethene	NC	NC	1.08E-10	1.58E-08	1.59E-08	NC	NC	NC	NC	NC
Vanadium	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Vinyl chloride	NC	NC	2.38E-08	6.59E-08	8.97E-08	NC	NC	NC	NC	NC
Zinc	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total Risk	3.89E-06	5.50E-08	4.84E-06	1.32E-07	8.92E-06	9.97E-08	1.56E-08	2.00E-07	5.36E-08	3.69E-07

Notes:
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NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
RME - Reasonable Maximum Exposure.

TABLE 6-6
TOTAL POTENTIAL HAZARD INDEX
CONSTRUCTION WORKER - RME
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Transect 3			Transect 4			Transect 6		
	Surface Soil		Total	Surface Soil		Total	Surface Soil		Total
Constituent	Ing/Derm.	Inhalation	HQ	Ing/Derm.	Inhalation	HQ	Ing/Derm.	Inhalation	HQ
1,1,2,2-Tetrachloroethane	NC	NC	NC	NC	NC	NC	NC	NC	NC
1,4-Dichlorobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
2,4,5-TP (Silvex)	NC	NC	NC	NC	NC	NC	NC	NC	NC
2,4,6-Trichlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC
2,4-Dichlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Chlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Nitroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC
3-Methylphenol/4-Methylphenol	NC	NC	NC	NC	NC	NC	NC	NC	NC
4,4-DDE	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Chloroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Methyl-2-pentanone	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Nitroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC
alpha-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Antimony	NC	NC	NC	NC	NC	NC	NC	NC	NC
Arsenic	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC
beta-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Cadmium	NC	NC	NC	NC	NC	NC	NC	NC	NC
Carbazole	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chlorobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chloroform	NC	NC	NC	NC	NC	NC	NC	NC	NC
Cis/Trans-1,2-Dichloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Copper	NC	NC	NC	NC	NC	NC	NC	NC	NC
delta-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dieldrin	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Heptachlor	NC	NC	NC	NC	NC	NC	NC	NC	NC
Heptachlor epoxide	NC	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Lead	NC	NC	NC	NC	NC	NC	NC	NC	NC
Molybdenum	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nickel	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nitrobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pentachlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenol	NC	NC	NC	NC	NC	NC	NC	NC	NC
Tetrachloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total 2,3,7,8-TCDD TEQ	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total PCBs	NC	NC	NC	NC	NC	NC	NC	NC	NC
Trichloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Vanadium	NC	NC	NC	NC	NC	NC	NC	NC	NC
Vinyl chloride	NC	NC	NC	NC	NC	NC	NC	NC	NC
Zinc	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total HI	NC	NC	NC	NC	NC	NC	NC	NC	NC

Notes:
HI - Hazard Index.
HQ - Hazard Quotient
ing/derm - Ingestion/Dermal.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
RME - Reasonable Maximum Exposure.

TABLE 6-6
TOTAL POTENTIAL HAZARD INDEX
CONSTRUCTION WORKER - RME
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Transect 7			Site G			Site H				
	Surface Soil		Total	Groundwater		Total	Surface Soil		Groundwater		Total
Constituent	Ing/Derm.	Inhalation	HQ	Ing/Derm.	Inhalation	HQ	Ing/Derm.	Inhalation	Ing/Derm.	Inhalation	HQ
1,1,2,2-Tetrachloroethane	NC	NC	NC	NC	NC	NC	NC	NC	9.15E-07	NC	9.15E-07
1,4-Dichlorobenzene	NC	NC	NC	7.84E-04	NC	7.84E-04	NC	NC	2.61E-03	NC	2.61E-03
2,4,5-TP (Silvex)	NC	NC	NC	8.13E-05	NC	8.13E-05	NC	NC	NC	NC	NC
2,4,6-Trichlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2,4-Dichlorophenol	NC	NC	NC	1.28E-02	NC	1.28E-02	NC	NC	1.32E-03	NC	1.32E-03
2-Chlorophenol	NC	NC	NC	6.86E-04	NC	6.86E-04	NC	NC	NC	NC	NC
2-Nitroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
3-Methylphenol/4-Methylphenol	NC	NC	NC	2.40E-04	NC	2.40E-04	NC	NC	NC	NC	NC
4,4-DDE	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Chloroaniline	NC	NC	NC	2.10E-02	NC	2.10E-02	NC	NC	2.20E-03	NC	2.20E-03
4-Methyl-2-pentanone	NC	NC	NC	3.02E-05	8.55E-02	8.55E-02	NC	NC	NC	NC	NC
4-Nitroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
alpha-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Antimony	NC	NC	NC	NC	NC	NC	NC	NC	2.94E-04	NC	2.94E-04
Arsenic	*2.39E-03*	*NC*	*2.39E-03*	*NC*	*NC*	*NC*	*1.02E-02*	NC	3.01E-03	NC	1.32E-02
Benzene	NC	NC	NC	2.56E-02	9.50E-01	9.76E-01	NC	NC	2.52E-02	9.35E-01	9.60E-01
Benzo(a)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
beta-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Cadmium	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Carbazole	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chlorobenzene	NC	NC	NC	4.55E-03	3.37E-01	3.41E-01	NC	NC	5.14E-03	3.80E-01	3.85E-01
Chloroform	NC	NC	NC	NC	NC	NC	NC	NC	1.92E-04	2.12E+00	2.12E+00
Cis/Trans-1,2-Dichloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Copper	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
delta-BHC	NC	NC	NC	4.41E-04	NC	4.41E-04	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dieldrin	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	5.92E-04	2.29E-03	2.89E-03
Heptachlor	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Heptachlor epoxide	NC	NC	NC	NC	NC	NC	NC	NC	1.84E-03	NC	1.84E-03
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Lead	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Molybdenum	NC	NC	NC	6.50E-05	NC	6.50E-05	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	3.82E-03	9.93E-01	9.97E-01	NC	NC	3.83E-03	9.95E-01	9.99E-01
Nickel	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nitrobenzene	NC	NC	NC	NC	NC	NC	NC	NC	4.16E-04	NC	4.16E-04
Pentachlorophenol	NC	NC	NC	1.89E-02	NC	1.89E-02	NC	NC	4.70E-02	NC	4.70E-02
Phenol	NC	NC	NC	7.31E-05	NC	7.31E-05	NC	NC	1.60E-06	NC	1.60E-06
Tetrachloroethene	NC	NC	NC	3.67E-04	5.63E-04	9.29E-04	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	8.61E-04	3.08E-02	3.16E-02	NC	NC	NC	NC	NC
Total 2,3,7,8-TCDD TEQ	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total PCBs	NC	NC	NC	NC	NC	NC	1.29E-02	NC	NC	NC	1.29E-02
Trichloroethene	NC	NC	NC	2.54E-04	NC	2.54E-04	NC	NC	6.29E-05	NC	6.29E-05
Vanadium	NC	NC	NC	6.36E-05	NC	6.36E-05	NC	NC	NC	NC	NC
Vinyl chloride	NC	NC	NC	5.24E-05	7.10E-04	7.62E-04	NC	NC	NC	NC	NC
Zinc	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total HI	2.39E-03	NC	2.39E-03	9.06E-02	2.40E+00	2.49E+00	2.31E-02	NC	9.37E-02	4.43E+00	4.55E+00

Notes:
HI - Hazard Index.
HQ - Hazard Quotient
ing/derm - Ingestion/Dermal.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
RME - Reasonable Maximum Exposure.

TABLE 6-6
TOTAL POTENTIAL HAZARD INDEX
CONSTRUCTION WORKER - RME
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Site I					Site L				
	Surface Soil		Groundwater		Total	Surface Soil		Groundwater		Total
Constituent	Ing/Derm.	Inhalation	Ing/Derm.	Inhalation	HQ	Ing/Derm.	Inhalation	Ing/Derm.	Inhalation	HQ
1,1,2,2-Tetrachloroethane	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
1,4-Dichlorobenzene	NC	NC	1.06E-02	NC	1.06E-02	NC	NC	NC	NC	NC
2,4,5-TP (Silvex)	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2,4,6-Trichlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2,4-Dichlorophenol	NC	NC	NC	NC	NC	NC	NC	2.77E-04	NC	2.77E-04
2-Chlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Nitroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
3-Methylphenol/4-Methylphenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4,4-DDE	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Chloroaniline	NC	NC	3.40E-03	NC	3.40E-03	NC	NC	1.41E-04	NC	1.41E-04
4-Methyl-2-pentanone	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Nitroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
alpha-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Antimony	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Arsenic	NC	NC	NC	NC	NC	5.92E-03	NC	3.10E-02	NC	3.70E-02
Benzene	NC	NC	7.28E-03	2.71E-01	2.78E-01	NC	NC	8.86E-04	2.19E-02	2.28E-02
Benzo(a)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
beta-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Cadmium	NC	NC	1.27E-03	NC	1.27E-03	NC	NC	NC	NC	NC
Carbazole	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chlorobenzene	NC	NC	7.91E-03	5.85E-01	5.93E-01	NC	NC	NC	NC	NC
Chloroform	NC	NC	NC	NC	NC	NC	NC	1.03E-04	7.58E-01	7.58E-01
Cis/Trans-1,2-Dichloroethene	NC	NC	4.28E-04	NC	4.28E-04	NC	NC	NC	NC	NC
Copper	5.57E-02	NC	NC	NC	5.57E-02	NC	NC	NC	NC	NC
delta-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dieldrin	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Heptachlor	NC	NC	1.36E-05	NC	1.36E-05	NC	NC	NC	NC	NC
Heptachlor epoxide	NC	NC	1.17E-03	NC	1.17E-03	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Lead	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Molybdenum	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nickel	NC	NC	4.84E-04	NC	4.84E-04	NC	NC	6.70E-02	NC	6.70E-02
Nitrobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pentachlorophenol	NC	NC	2.37E-03	NC	2.37E-03	NC	NC	NC	NC	NC
Phenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Tetrachloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total 2,3,7,8-TCDD TEQ	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total PCBs	1.03E+00	NC	5.01E-02	NC	1.08E+00	9.08E-03	NC	NC	NC	9.08E-03
Trichloroethene	NC	NC	1.14E-04	NC	1.14E-04	NC	NC	NC	NC	NC
Vanadium	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Vinyl chloride	NC	NC	7.73E-04	1.05E-02	1.13E-02	NC	NC	NC	NC	NC
Zinc	NC	NC	1.01E-04	NC	1.01E-04	NC	NC	NC	NC	NC
Total HI	1.08E+00	NC	8.60E-02	8.66E-01	2.04E+00	1.50E-02	NC	9.94E-02	7.80E-01	8.95E-01

Notes:
HI - Hazard Index.
HQ - Hazard Quotient
ing/derm - Ingestion/Dermal.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
RME - Reasonable Maximum Exposure.

TABLE 6-7
TOTAL POTENTIAL CARCINOGENIC RISK
TRESPASSING TEEN - RME
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Site G	Site H				Site I				Site L			
	Groundwater	Surface Soil		Groundwater	Total	Surface Soil		Groundwater	Total	Surface Soil		Groundwater	Total
Constituent	**Inhalation Risk**	**Ing/Derm.**	**Inhalation**	**Inhalation**	**Risk**	**Ing/Derm.**	**Inhalation**	**Inhalation**	**Risk**	**Ing/Derm.**	**Inhalation**	**Inhalation**	**Risk**
1,1,2,2-Tetrachloroethane	NC	NC	NC	2.90E-11	2.90E-11	NC	NC	NC	NC	NC	NC	NC	NC
4-Methyl-2-pentanone	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Arsenic	NC	6.88E-07	6.95E-10	NC	6.88E-07	NC	NC	NC	NC	3.98E-07	2.68E-10	NC	3.98E-07
Benzene	6.16E-10	NC	NC	6.16E-10	6.16E-10	NC	NC	5.28E-10	5.28E-10	NC	NC	4.40E-12	4.40E-12
Benzo(a)pyrene	NC	NC	NC	NC	NC	1.17E-07	6.46E-12	NC	1.17E-07	3.71E-07	1.05E-11	NC	3.71E-07
Chlorobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chloroform	NC	NC	NC	7.59E-10	7.59E-10	NC	NC	NC	NC	NC	NC	4.25E-11	4.25E-11
Copper	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	6.89E-08	1.95E-12	NC	6.89E-08
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Tetrachloroethene	1.71E-11	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total 2,3,7,8-TCDD TEQ	NC	2.49E-06	1.41E-10	NC	2.49E-06	2.30E-05	1.70E-09	NC	2.30E-05	NC	NC	NC	NC
Total PCBs	NC	6.22E-08	2.20E-12	NC	6.22E-08	4.97E-06	2.30E-10	NC	4.97E-06	4.38E-08	1.03E-12	NC	4.38E-08
Trichloroethene	5.83E-11	NC	NC	2.40E-11	2.40E-11	NC	NC	2.19E-10	2.19E-10	NC	NC	NC	NC
Vinyl chloride	2.02E-10	NC	NC	NC	NC	NC	NC	2.02E-08	2.02E-08	NC	NC	NC	NC
Total Risk	8.94E-10	3.24E-06	8.38E-10	1.43E-09	3.24E-06	2.81E-05	1.94E-09	2.10E-08	2.81E-05	8.81E-07	2.82E-10	4.69E-11	8.81E-07

Notes:
Ing/Derm - Ingestion/Dermal Contact.
RME - Reasonable Maximum Exposure.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.

TABLE 6-8
TOTAL POTENTIAL HAZARD INDEX
TRESPASSING TEEN - RME
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Site G	Site H				Site I				Site L			
	Groundwater	Surface Soil		Groundwater	Total	Surface Soil		Groundwater	Total	Surface Soil		Groundwater	Total
	Inhalation HQ	Ing/Derm.	Inhalation	Inhalation	HQ	Ing/Derm.	Inhalation	Inhalation	HQ	Ing/Derm.	Inhalation	Inhalation	HQ
1,1,2,2-Tetrachloroethane	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Methyl-2-pentanone	1.51E-06	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Arsenic	NC	9.72E-03	NC	NC	9.72E-03	NC	NC	NC	NC	5.62E-03	NC	NC	5.62E-03
Benzene	3.00E-04	NC	NC	3.00E-04	3.00E-04	NC	NC	2.57E-04	2.57E-04	NC	NC	2.14E-06	2.14E-06
Benzo(a)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chlorobenzene	6.05E-05	NC	NC	1.02E-04	1.02E-04	NC	NC	5.16E-04	5.16E-04	NC	NC	NC	NC
Chloroform	NC	NC	NC	1.06E-03	1.06E-03	NC	NC	NC	NC	NC	NC	5.92E-05	5.92E-05
Copper	NC	NC	NC	NC	NC	5.33E-02	NC	NC	5.33E-02	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	1.53E-06	1.53E-06	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	2.93E-05	NC	NC	5.52E-05	5.52E-05	NC	NC	NC	NC	NC	NC	NC	NC
Tetrachloroethene	4.79E-07	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Toluene	1.08E-05	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total 2,3,7,8-TCDD TEQ	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total PCBs	NC	9.90E-03	NC	NC	9.90E-03	7.90E-01	NC	NC	7.90E-01	6.97E-03	NC	NC	6.97E-03
Trichloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Vinyl chloride	2.93E-06	NC	NC	NC	NC	NC	NC	2.93E-04	2.93E-04	NC	NC	NC	NC
Total	4.05E-04	1.96E-02	NC	1.52E-03	2.11E-02	8.43E-01	NC	1.07E-03	8.44E-01	1.26E-02	NC	6.14E-05	1.27E-02

Notes:
HI - Hazard Index.
HQ - Hazard Quotient.
Ing/Derm - Ingestion/Dermal Contact.
RME - Reasonable Maximum Exposure.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.

TABLE 6-9
TOTAL POTENTIAL CARCINOGENIC RISK
RECREATIONAL TEEN - RME
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Dead Creek and Borrow Pit Lake Sediment		
	Wading	**Swimming**	**Total Risk**
Arsenic	2.05E-07	1.03E-07	3.08E-07
Total PCBs	9.70E-08	4.85E-08	1.45E-07
Total Risk	3.02E-07	1.51E-07	4.53E-07

Notes:
RME - Reasonable Maximum Exposure.
(a) - Based on exposure scenario assumptions, Swimming potential risk is equal to 1/2 wading potential risk.

TABLE 6-10
TOTAL POTENTIAL HAZARD INDEX
RECREATIONAL TEEN - RME
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Dead Creek and Borrow Pit Lake Sediment		
	Wading	**Swimming**	**Total HQ**
Arsenic	2.90E-03	1.45E-03	4.35E-03
Total PCBs	1.54E-02	7.71E-03	2.31E-02
Total HI	1.83E-02	9.16E-03	2.75E-02

Notes:
HQ - Hazard Quotient.
HI - Hazard Index.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
RME - Reasonable Maximum Exposure.
(a) - Based on exposure scenario assumptions, Swimming potential risk is equal to 1/2 wading potential risk.

TABLE 6-11
TOTAL POTENTIAL CARCINOGENIC RISK
RECREATIONAL FISHER - RME
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Dead Creek and Borrow Pit Lake Sediment	Fish	Total Risk
Arsenic	3.42E-07	3.31E-05	3.34E-05
Total PCBs	2.41E-07	NC	2.41E-07
Total Risk	5.83E-07	3.31E-05	3.36E-05

Notes:
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
RME - Reasonable Maximum Exposure.

TABLE 6-12
TOTAL POTENTIAL HAZARD INDEX
RECREATIONAL FISHER - RME
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Dead Creek and Borrow Pit Lake		
	Sediment	**Fish**	**Total HQ**
Arsenic	1.78E-03	1.71E-01	1.73E-01
Total PCBs	1.40E-02	NC	1.40E-02
Total HI	1.58E-02	1.71E-01	1.87E-01

Notes:
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
RME - Reasonable Maximum Exposure.

TABLE 6-13
TOTAL POTENTIAL CARCINOGENIC RISK
RESIDENTIAL RECEPTORS - RME
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Site N			Transect 3			Transect 4		
	Surface Soil	Inhalation	Total Risk	Surface Soil	Inhalation	Total Risk	Surface Soil	Inhalation	Total Risk
Arsenic	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	NC	NC	1.27E-06	4.66E-11	1.27E-06
Benzo(a)pyrene	9.74E-07	5.36E-11	9.74E-07	7.68E-07	2.82E-11	7.68E-07	1.03E-05	3.80E-10	1.03E-05
Benzo(b)fluoranthene	NC	NC	NC	1.18E-07	4.34E-12	1.18E-07	8.30E-07	3.05E-11	8.30E-07
Dibenzo(a,h)anthracene	3.25E-07	1.79E-11	3.25E-07	2.95E-07	1.08E-11	2.95E-07	6.79E-07	2.49E-11	6.79E-07
Dieldrin	NC	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	2.82E-07	1.04E-11	2.82E-07
Total:	1.30E-06	7.15E-11	1.30E-06	1.18E-06	4.34E-11	1.18E-06	1.34E-05	4.92E-10	1.34E-05

Notes:
NC - Not Calculated, no dose-response value, or not a constituent of potential concern in this area/medium.
RME - Reasonable Maximum Exposure.

TABLE 6-13
TOTAL POTENTIAL CARCINOGENIC RISK
RESIDENTIAL RECEPTORS - RME
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Transect 5			Transect 6			Transect 7			
Constituent	**Surface Soil**	**Inhalation**	**Total Risk**	**Surface Soil**	**Inhalation**	**Total Risk**	**Surface Soil**	**Inhalation**	**Produce**	**Total Risk**
Arsenic	NC	NC	NC	NC	NC	NC	8.09E-06	7.86E-09	5.33E-05	6.14E-05
Benzo(a)anthracene	NC	NC	NC	1.24E-06	4.56E-11	1.24E-06	5.61E-07	2.06E-11	NC	5.61E-07
Benzo(a)pyrene	1.00E-06	3.69E-11	1.00E-06	1.06E-05	3.90E-10	1.06E-05	6.20E-06	2.28E-10	NC	6.20E-06
Benzo(b)fluoranthene	NC	NC	NC	1.30E-06	4.77E-11	1.30E-06	6.49E-07	2.39E-11	NC	6.50E-07
Dibenzo(a,h)anthracene	5.61E-07	2.06E-11	5.61E-07	9.74E-07	3.58E-11	9.74E-07	5.90E-07	2.17E-11	NC	5.90E-07
Dieldrin	1.95E-06	5.63E-11	1.95E-06	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	1.74E-07	6.40E-12	1.74E-07	1.86E-07	6.83E-12	NC	1.86E-07
Total:	3.52E-06	1.14E-10	3.52E-06	1.43E-05	5.26E-10	1.43E-05	1.63E-05	8.16E-09	5.33E-05	6.96E-05

Notes:
NC - Not Calculated, no dose-response value, or not a constituent of potential concern in this area/medium.
RME - Reasonable Maximum Exposure.

TABLE 6-14
TOTAL POTENTIAL HAZARD INDEX
RESIDENTIAL RECEPTORS - RME
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Site N			Transect 3			Transect 4		
Constituent	**Surface Soil**	**Inhalation**	**Total HQ**	**Surface Soil**	**Inhalation**	**Total HQ**	**Surface Soil**	**Inhalation**	**Total HQ**
Arsenic	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dieldrin	NC	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total HI:	NC	NC	NC	NC	NC	NC	NC	NC	NC

Notes:
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated, no dose-response value, or not a constituent of potential concern in this area/medium.
RME - Reasonable Maximum Exposure.

TABLE 6-14
TOTAL POTENTIAL HAZARD INDEX
RESIDENTIAL RECEPTORS - RME
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Transect 5			Transect 6			Transect 7			
Constituent	**Surface Soil**	**Inhalation**	**Total HQ**	**Surface Soil**	**Inhalation**	**Total HQ**	**Surface Soil**	**Inhalation**	**Produce**	**Total HQ**
Arsenic	NC	NC	NC	NC	NC	NC	1.46E-01	NC	5.13E-02	1.97E-01
Benzo(a)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dieldrin	1.96E-02	NC	1.96E-02	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total HI:	1.96E-02	NC	1.96E-02	NC	NC	NC	1.46E-01	NC	5.13E-02	1.97E-01

Notes:
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated, no dose-response value, or not a constituent of potential concern in this area/medium.
RME - Reasonable Maximum Exposure.

TABLE 6-15
TOTAL POTENTIAL CARCINOGENIC RISK
INDOOR WORKER - MLE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Site G Groundwater Inhalation Risk	Site H Groundwater Inhalation Risk	Site I Groundwater Inhalation Risk	Site L Groundwater Inhalation Risk
1,1,2,2-Tetrachloroethane	NC	3.56E-10	NC	NC
4-Methyl-2-pentanone	NC	NC	NC	NC
Benzene	2.68E-08	2.68E-08	8.02E-09	2.54E-10
Chlorobenzene	NC	NC	NC	NC
Chloroform	NC	1.96E-08	NC	2.70E-09
Ethylbenzene	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC
Tetrachloroethene	3.51E-10	2.24E-10	NC	NC
Toluene	NC	NC	NC	NC
Trichloroethene	7.61E-10	NC	1.06E-09	NC
Vinyl chloride	2.93E-09	NC	5.04E-08	NC
Total	3.09E-08	4.70E-08	5.95E-08	2.95E-09

Notes:
MLE - Most Likely Exposure.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.

TABLE 6-16
TOTAL POTENTIAL HAZARD INDEX
INDOOR WORKER - MLE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Site G Groundwater Inhalation HQ	Site H Groundwater Inhalation HQ	Site I Groundwater Inhalation HQ	Site L Groundwater Inhalation HQ
1,1,2,2-Tetrachloroethane	NC	NC	NC	NC
4-Methyl-2-pentanone	1.44E-04	NC	NC	NC
Benzene	2.05E-02	2.05E-02	6.12E-03	1.94E-04
Chlorobenzene	1.96E-03	5.32E-03	6.58E-03	NC
Chloroform	NC	4.30E-02	NC	5.91E-03
Ethylbenzene	NC	6.62E-05	NC	NC
Naphthalene	9.77E-04	2.30E-03	NC	NC
Tetrachloroethene	1.54E-05	9.82E-06	NC	NC
Toluene	3.21E-04	NC	NC	NC
Trichloroethene	NC	NC	NC	NC
Vinyl chloride	6.66E-05	NC	1.15E-03	NC
Total HI	2.40E-02	7.11E-02	1.38E-02	6.10E-03

Notes:
HI - Hazard Index.
HQ - Hazard Quotient.
MLE - Most Likely Exposure.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.

TABLE 6-17
TOTAL POTENTIAL CARCINOGENIC RISK
OUTDOOR WORKER - MLE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Transect 3			Transect 4			Transect 6			Transect 7		
	Surface Soil		Total	Surface Soil		Total	Surface Soil		Total	Surface Soil		Total
Constituent	Ing/Derm.	Inhalation	Risk	Ing/Derm.	Inhalation	Risk	Ing/Derm.	Inhalation	Risk	Ing/Derm.	Inhalation	Risk
1,1,2,2-Tetrachloroethane	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Methyl-2-pentanone	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Arsenic	NC	NC	NC	NC	NC	NC	NC	NC	NC	1.01E-07	7.53E-10	1.02E-07
Benzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	7.46E-09	2.13E-12	7.47E-09	3.21E-08	9.19E-12	3.22E-08	2.75E-08	7.85E-12	2.75E-08	2.04E-08	5.83E-12	2.04E-08
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chlorobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chloroform	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Copper	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	7.08E-09	2.03E-12	7.08E-09	NC	NC	NC	NC	NC	NC
Dieldrin	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Tetrachloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total 2,3,7,8-TCDD TEQ	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total PCBs	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Trichloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Vinyl chloride	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Zinc	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total	7.46E-09	2.13E-12	7.47E-09	3.92E-08	1.12E-11	3.92E-08	2.75E-08	7.85E-12	2.75E-08	1.21E-07	7.59E-10	1.22E-07

Notes:
Ing/Derm - Ingestion/Dermal Contact.
MLE - Most Likely Exposure.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.

TABLE 6-17
TOTAL POTENTIAL CARCINOGENIC RISK
OUTDOOR WORKER - MLE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Site G	Site H				Site I				Site L			
	Groundwater	Surface Soil		Groundwater	Total	Surface Soil		Groundwater	Total	Surface Soil		Groundwater	Total
Constituent	Inhalation Risk	Ing/Derm.	Inhalation	Inhalation	Risk	Ing/Derm.	Inhalation	Inhalation	Risk	Ing/Derm.	Inhalation	Inhalation	Risk
1,1,2,2-Tetrachloroethane	NC	NC	NC	6.64E-11	6.64E-11	NC	NC	NC	NC	NC	NC	NC	NC
4-Methyl-2-pentanone	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Arsenic	NC	2.31E-07	2.58E-09	NC	2.33E-07	NC	NC	NC	NC	3.37E-07	2.51E-09	NC	3.39E-07
Benzene	5.50E-10	NC	NC	1.24E-09	1.24E-09	NC	NC	3.62E-10	3.62E-10	NC	NC	1.37E-11	1.37E-11
Benzo(a)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	NC	NC	NC	NC	3.43E-08	1.92E-11	NC	3.43E-08	1.25E-07	3.58E-11	NC	1.25E-07
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chlorobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chloroform	NC	NC	NC	8.22E-10	8.22E-10	NC	NC	NC	NC	NC	NC	1.36E-10	1.36E-10
Copper	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	2.48E-08	7.09E-12	NC	2.48E-08
Dieldrin	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Tetrachloroethene	2.02E-11	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total 2,3,7,8-TCDD TEQ	NC	1.09E-06	6.02E-10	NC	1.09E-06	6.83E-06	4.94E-09	NC	6.84E-06	NC	NC	NC	NC
Total PCBs	NC	2.71E-08	9.95E-12	NC	2.71E-08	1.28E-06	6.17E-10	NC	1.28E-06	2.01E-08	4.93E-12	NC	2.01E-08
Trichloroethene	5.71E-11	NC	NC	NC	NC	NC	NC	6.78E-11	6.78E-11	NC	NC	NC	NC
Vinyl chloride	4.21E-10	NC	NC	NC	NC	NC	NC	6.50E-09	6.50E-09	NC	NC	NC	NC
Zinc	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total	1.05E-09	1.35E-06	3.19E-09	2.13E-09	1.35E-06	8.15E-06	5.57E-09	6.93E-09	8.16E-06	5.07E-07	2.56E-09	1.50E-10	5.10E-07

Notes:
Ing/Derm - Ingestion/Dermal Contact.
MLE - Most Likely Exposure.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.

TABLE 6-18
TOTAL POTENTIAL HAZARD INDEX
OUTDOOR WORKER - MLE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Transect 3			Transect 4			Transect 6			Transect 7		
	Surface Soil		Total	Surface Soil		Total	Surface Soil		Total	Surface Soil		Total
Constituent	Ing/Derm.	Inhalation	HQ	Ing/Derm.	Inhalation	HQ	Ing/Derm.	Inhalation	HQ	Ing/Derm.	Inhalation	HQ
1,1,2,2-Tetrachloroethane	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Methyl-2-pentanone	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Arsenic	NC	NC	NC	NC	NC	NC	NC	NC	NC	2.25E-03	NC	2.25E-03
Benzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chlorobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chloroform	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Copper	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dieldrin	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Tetrachloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total 2,3,7,8-TCDD TEQ	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total PCBs	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Trichloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Vinyl chloride	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Zinc	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total HI	NC	NC	NC	NC	NC	NC	NC	NC	NC	2.25E-03	NC	2.25E-03

Notes:
Ing/Derm - Ingestion/Dermal Contact.
HI - Hazard Index.
HQ - Hazard Quotient.
MLE - Most Likely Exposure.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.

TABLE 6-18
TOTAL POTENTIAL HAZARD INDEX
OUTDOOR WORKER - MLE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Site G	Site H				Site I				Site L			
	Groundwater	Surface Soil		Groundwater	Total	Surface Soil		Groundwater	Total	Surface Soil		Groundwater	Total
Constituent	**Inhalation HQ**	**Ing/Derm.**	**Inhalation**	**Inhalation**	**HQ**	**Ing/Derm.**	**Inhalation**	**Inhalation**	**HQ**	**Ing/Derm.**	**Inhalation**	**Inhalation**	**HQ**
1,1,2,2-Tetrachloroethane	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Methyl-2-pentanone	2.45E-06	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Arsenic	NC	5.12E-03	NC	NC	5.12E-03	NC	NC	NC	NC	7.48E-03	NC	NC	7.48E-03
Benzene	4.20E-04	NC	NC	9.45E-04	9.45E-04	NC	NC	2.76E-04	2.76E-04	NC	NC	1.05E-05	1.05E-05
Benzo(a)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chlorobenzene	1.01E-04	NC	NC	2.50E-04	2.50E-04	NC	NC	3.02E-04	3.02E-04	NC	NC	NC	NC
Chloroform	NC	NC	NC	1.80E-03	1.80E-03	NC	NC	NC	NC	NC	NC	2.97E-04	2.97E-04
Copper	NC	NC	NC	NC	NC	4.03E-02	NC	NC	4.03E-02	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dieldrin	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	3.54E-06	3.54E-06	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	4.86E-05	NC	NC	1.04E-04	1.04E-04	NC	NC	NC	NC	NC	NC	NC	NC
Tetrachloroethene	8.87E-07	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Toluene	1.67E-05	NC	NC	6.26E-07	6.26E-07	NC	NC	NC	NC	NC	NC	NC	NC
Total 2,3,7,8-TCDD TEQ	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total PCBs	NC	6.77E-03	NC	NC	6.77E-03	3.21E-01	NC	NC	3.21E-01	5.02E-03	NC	NC	5.02E-03
Trichloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Vinyl chloride	9.58E-06	NC	NC	NC	NC	NC	NC	1.48E-04	1.48E-04	NC	NC	NC	NC
Zinc	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total HI	5.99E-04	1.19E-02	NC	3.10E-03	1.50E-02	3.61E-01	NC	7.26E-04	3.62E-01	1.25E-02	NC	3.08E-04	1.28E-02

Notes:
Ing/Derm - Ingestion/Dermal Contact.
HI - Hazard Index.
HQ - Hazard Quotient
MLE - Most Likely Exposure.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.

TABLE 6-19
TOTAL POTENTIAL CARCINOGENIC RISK
CONSTRUCTION WORKER - MLE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Transect 3			Transect 4			Transect 6		
	Surface Soil		Total	Surface Soil		Total	Surface Soil		Total
Constituent	Ing/Derm.	Inhalation	Risk	Ing/Derm.	Inhalation	Risk	Ing/Derm.	Inhalation	Risk
1,1,2,2-Tetrachloroethane	NC	NC	NC	NC	NC	NC	NC	NC	NC
1,4-Dichlorobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
2,4,5-TP (Silvex)	NC	NC	NC	NC	NC	NC	NC	NC	NC
2,4,6-Trichlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC
2,4-Dichlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Chlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Nitroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC
3-Methylphenol/4-Methylphenol	NC	NC	NC	NC	NC	NC	NC	NC	NC
4,4-DDE	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Chloroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Methyl-2-pentanone	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Nitroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC
alpha-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Antimony	NC	NC	NC	NC	NC	NC	NC	NC	NC
Arsenic	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	NC	NC	3.27E-10	3.19E-12	3.30E-10	NC	NC	NC
Benzo(a)pyrene	3.49E-10	3.42E-12	3.53E-10	1.55E-09	1.52E-11	1.57E-09	1.29E-09	1.26E-11	1.30E-09
Benzo(b)fluoranthene	NC	NC	NC	2.73E-10	2.67E-12	2.76E-10	NC	NC	NC
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC
beta-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Cadmium	NC	NC	NC	NC	NC	NC	NC	NC	NC
Carbazole	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chlorobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chloroform	NC	NC	NC	NC	NC	NC	NC	NC	NC
Cis/Trans-1,2-Dichloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Copper	NC	NC	NC	NC	NC	NC	NC	NC	NC
delta-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	6.10E-10	5.97E-12	6.16E-10	NC	NC	NC
Dieldrin	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Heptachlor	NC	NC	NC	NC	NC	NC	NC	NC	NC
Heptachlor epoxide	NC	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Lead	NC	NC	NC	NC	NC	NC	NC	NC	NC
Molybdenum	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nickel	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nitrobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pentachlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenol	NC	NC	NC	NC	NC	NC	NC	NC	NC
Tetrachloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total 2,3,7,8-TCDD TEQ	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total PCBs	NC	NC	NC	NC	NC	NC	NC	NC	NC
Trichloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Vanadium	NC	NC	NC	NC	NC	NC	NC	NC	NC
Vinyl chloride	NC	NC	NC	NC	NC	NC	NC	NC	NC
Zinc	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total Risk	3.49E-10	3.42E-12	3.53E-10	2.76E-09	2.70E-11	2.79E-09	1.29E-09	1.26E-11	1.30E-09

Notes:
Ing/Derm - Ingestion/Dermal Contact.
MLE - Most Likely Exposure.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.

TABLE 6-19
TOTAL POTENTIAL CARCINOGENIC RISK
CONSTRUCTION WORKER - MLE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Transect 7			Site G			Site H				
	Surface Soil		Total	Groundwater		Total	Surface Soil		Groundwater		Total
Constituent	Ing/Derm.	Inhalation	Risk	Ing/Derm.	Inhalation	Risk	Ing/Derm.	Inhalation	Ing/Derm.	Inhalation	Risk
1,1,2,2-Tetrachloroethane	NC	NC	NC	NC	NC	NC	NC	NC	7.84E-11	3.81E-09	3.89E-09
1,4-Dichlorobenzene	NC	NC	NC	4.03E-09	NC	4.03E-09	NC	NC	1 34E-08	NC	1.34E-08
2,4,5-TP (Silvex)	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2,4,6-Trichlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	1.30E-09	NC	1.30E-09
2,4-Dichlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Chlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Nitroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
3-Methylphenol/4-Methylphenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4,4-DDE	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Chloroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Methyl-2-pentanone	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Nitroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
alpha-BHC	NC	NC	NC	4.99E-09	NC	4.99E-09	NC	NC	1.73E-10	NC	1.73E-10
Antimony	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Arsenic	3.32E-09	1.21E-09	4.53E-09	NC	NC	NC	7.59E-09	2.75E-09	9.67E-09	NC	2.00E-08
Benzene	NC	NC	NC	8.22E-09	5.33E-08	6.15E-08	NC	NC	8.09E-09	5.25E-08	6.06E-08
Benzo(a)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	9.54E-10	9.33E-12	9.63E-10	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
beta-BHC	NC	NC	NC	3.53E-11	NC	3.53E-11	NC	NC	NC	NC	[illegible]
Cadmium	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Carbazole	NC	NC	NC	NC	NC	NC	NC	NC	2.63E-11	NC	2.63E-11
Chlorobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chloroform	NC	NC	NC	NC	NC	NC	NC	NC	8.39E-11	4.15E-08	4 16E-08
Cis/Trans-1,2-Dichloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Copper	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
delta-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dieldrin	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Heptachlor	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Heptachlor epoxide	NC	NC	NC	NC	NC	NC	NC	NC	1.56E-09	NC	1.56E-09
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Lead	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Molybdenum	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nickel	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nitrobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pentachlorophenol	NC	NC	NC	2.46E-07	NC	2.46E-07	NC	NC	9.73E-07	NC	9.73E-07
Phenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Tetrachloroethene	NC	NC	NC	1.36E-09	5.50E-10	1.91E-09	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total 2,3,7,8-TCDD TEQ	NC	NC	NC	4.45E-06	NC	4.45E-06	5.70E-08	6.44E-10	1.13E-07	NC	1 70E-07
Total PCBs	NC	NC	NC	NC	NC	NC	1.16E-09	1.06E-11	NC	NC	1.17E-09
Trichloroethene	NC	NC	NC	1.20E-10	1.05E-08	1.07E-08	NC	NC	2.96E-11	2.61E-09	2 64E-09
Vanadium	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Vinyl chloride	NC	NC	NC	8.08E-10	1.34E-09	2.15E-09	NC	NC	NC	NC	NC
Zinc	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total Risk	4.28E-09	1.22E-09	5.49E-09	4.71E-06	6.57E-08	4.78E-06	6.57E-08	3.41E-09	1.12E-06	1.00E-07	1.29E-06

Notes:
Ing/Derm - Ingestion/Dermal Contact.
MLE - Most Likely Exposure.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.

TABLE 6-19
TOTAL POTENTIAL CARCINOGENIC RISK
CONSTRUCTION WORKER - MLE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Site I					Site L				
	Surface Soil		Groundwater		Total Risk	Surface Soil		Groundwater		Total Risk
	Ing/Derm.	Inhalation	Ing/Derm.	Inhalation		Ing/Derm.	Inhalation	Ing/Derm.	Inhalation	
1,1,2,2-Tetrachloroethane	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
1,4-Dichlorobenzene	NC	NC	4.45E-08	NC	4.45E-08	NC	NC	NC	NC	NC
2,4,5-TP (Silvex)	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2,4,6-Trichlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2,4-Dichlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Chlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Nitroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
3-Methylphenol/4-Methylphenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4,4-DDE	NC	NC	2.81E-10	NC	2.81E-10	NC	NC	NC	NC	NC
4-Chloroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Methyl-2-pentanone	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Nitroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
alpha-BHC	NC	NC	6.11E-10	NC	6.11E-10	NC	NC	NC	NC	NC
Antimony	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Arsenic	NC	NC	NC	NC	NC	1.11E-08	4.02E-09	9.98E-08	NC	1.15E-07
Benzene	NC	NC	2.10E-09	1.36E-08	1.57E-08	NC	NC	2.85E-10	1.23E-09	1.52E-09
Benzo(a)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	1.60E-09	1.57E-11	NC	NC	1.62E-09	5.87E-09	5.74E-11	NC	NC	5.92E-09
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	NC	1.64E-10	NC	1.64E-10	NC	NC	NC	NC	NC
beta-BHC	NC	NC	4.90E-11	NC	4.90E-11	NC	NC	NC	NC	NC
Cadmium	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Carbazole	NC	NC	7.45E-11	NC	7.45E-11	NC	NC	NC	NC	NC
Chlorobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chloroform	NC	NC	NC	NC	NC	NC	NC	4.50E-11	1.48E-08	1.49E-08
Cis/Trans-1,2-Dichloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Copper	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
delta-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	1.16E-09	1.14E-11	NC	NC	1.17E-09
Dieldrin	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Heptachlor	NC	NC	2.19E-10	NC	2.19E-10	NC	NC	NC	NC	NC
Heptachlor epoxide	NC	NC	9.91E-10	NC	9.91E-10	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Lead	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Molybdenum	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nickel	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nitrobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pentachlorophenol	NC	NC	4.01E-08	NC	4.01E-08	NC	NC	NC	NC	NC
Phenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Tetrachloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total 2,3,7,8-TCDD TEQ	3.57E-07	4.03E-09	2.28E-06	NC	2.64E-06	NC	NC	NC	NC	NC
Total PCBs	5.49E-08	5.04E-10	1.43E-08	NC	6.98E-08	8.60E-10	7.89E-12	NC	NC	8.68E-10
Trichloroethene	NC	NC	3.11E-11	2.74E-09	2.77E-09	NC	NC	NC	NC	NC
Vanadium	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Vinyl chloride	NC	NC	9.21E-09	1.53E-08	2.45E-08	NC	NC	NC	NC	NC
Zinc	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total Risk	4.14E-07	4.55E-09	2.39E-06	3.16E-08	2.84E-06	1.90E-08	4.10E-09	1.00E-07	1.61E-08	1.39E-07

Notes:
Ing/Derm - Ingestion/Dermal Contact.
MLE - Most Likely Exposure.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.

TABLE 6-20
TOTAL POTENTIAL HAZARD INDEX
CONSTRUCTION WORKER - MLE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Transect 3			Transect 4			Transect 6		
	Surface Soil		Total	Surface Soil		Total	Surface Soil		Total
Constituent	Ing/Derm.	Inhalation	HQ	Ing/Derm.	Inhalation	HQ	Ing/Derm.	Inhalation	HQ
1,1,2,2-Tetrachloroethane	NC	NC	NC	NC	NC	NC	NC	NC	NC
1,4-Dichlorobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
2,4,5-TP (Silvex)	NC	NC	NC	NC	NC	NC	NC	NC	NC
2,4,6-Trichlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC
2,4-Dichlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Chlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Nitroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC
3-Methylphenol/4-Methylphenol	NC	NC	NC	NC	NC	NC	NC	NC	NC
4,4-DDE	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Chloroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Methyl-2-pentanone	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Nitroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC
alpha-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Antimony	NC	NC	NC	NC	NC	NC	NC	NC	NC
Arsenic	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC
beta-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Cadmium	NC	NC	NC	NC	NC	NC	NC	NC	NC
Carbazole	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chlorobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chloroform	NC	NC	NC	NC	NC	NC	NC	NC	NC
Cis/Trans-1,2-Dichloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Copper	NC	NC	NC	NC	NC	NC	NC	NC	NC
delta-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dieldrin	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Heptachlor	NC	NC	NC	NC	NC	NC	NC	NC	NC
Heptachlor epoxide	NC	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Lead	NC	NC	NC	NC	NC	NC	NC	NC	NC
Molybdenum	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nickel	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nitrobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pentachlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenol	NC	NC	NC	NC	NC	NC	NC	NC	NC
Tetrachloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total 2,3,7,8-TCDD TEQ	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total PCBs	NC	NC	NC	NC	NC	NC	NC	NC	NC
Trichloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Vanadium	NC	NC	NC	NC	NC	NC	NC	NC	NC
Vinyl chloride	NC	NC	NC	NC	NC	NC	NC	NC	NC
Zinc	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total HI	NC	NC	NC	NC	NC	NC	NC	NC	NC

Notes:
HQ - Hazard Quotient
HI - Hazard Index.
Ing/Derm - Ingestion/Dermal Contact.
MLE - Most Likely Exposure.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.

TABLE 6-20
TOTAL POTENTIAL HAZARD INDEX
CONSTRUCTION WORKER - MLE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Transect 7			Site G			Site H				
	Surface Soil		Total	Groundwater		Total	Surface Soil		Groundwater		Total
Constituent	Ing/Derm.	Inhalation	HQ	Ing/Derm.	Inhalation	HQ	Ing/Derm.	Inhalation	Ing/Derm.	Inhalation	HQ
1,1,2,2-Tetrachloroethane	NC	NC	NC	NC	NC	NC	NC	NC	4.57E-07	NC	4.57E-07
1,4-Dichlorobenzene	NC	NC	NC	3.92E-04	NC	3.92E-04	NC	NC	1.31E-03	NC	1.31E-03
2,4,5-TP (Silvex)	NC	NC	NC	4.06E-05	NC	4.06E-05	NC	NC	NC	NC	NC
2,4,6-Trichlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2,4-Dichlorophenol	NC	NC	NC	6.40E-03	NC	6.40E-03	NC	NC	6.58E-04	NC	6.58E-04
2-Chlorophenol	NC	NC	NC	3.43E-04	NC	3.43E-04	NC	NC	NC	NC	NC
2-Nitroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
3-Methylphenol/4-Methylphenol	NC	NC	NC	1.20E-04	NC	1.20E-04	NC	NC	NC	NC	NC
4,4-DDE	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Chloroaniline	NC	NC	NC	1.05E-02	NC	1.05E-02	NC	NC	1.10E-03	NC	1.10E-03
4-Methyl-2-pentanone	NC	NC	NC	1.51E-05	2.56E-02	2.57E-02	NC	NC	NC	NC	NC
4-Nitroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
alpha-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Antimony	NC	NC	NC	NC	NC	NC	NC	NC	1.47E-04	NC	1.47E-04
Arsenic	5.17E-04	NC	5.17E-04	NC	NC	NC	1.18E-03	NC	1.50E-03	NC	2.68E-03
Benzene	NC	NC	NC	1.28E-02	2.85E-01	2.98E-01	NC	NC	1.26E-02	2.81E-01	2.93E-01
Benzo(a)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
beta-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Cadmium	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Carbazole	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chlorobenzene	NC	NC	NC	2.28E-03	1.01E-01	1.03E-01	NC	NC	2.57E-03	1.14E-01	1.17E-01
Chloroform	NC	NC	NC	NC	NC	NC	NC	NC	9.62E-05	6.36E-01	6.36E-01
Cis/Trans-1,2-Dichloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Copper	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
delta-BHC	NC	NC	NC	2.21E-04	NC	2.21E-04	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dieldrin	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	2.96E-04	6.88E-04	9.84E-04
Heptachlor	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Heptachlor epoxide	NC	NC	NC	NC	NC	NC	NC	NC	9.21E-04	NC	9.21E-04
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Lead	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Molybdenum	NC	NC	NC	3.25E-05	NC	3.25E-05	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	1.91E-03	2.98E-01	3.00E-01	NC	NC	1.92E-03	2.98E-01	3.00E-01
Nickel	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nitrobenzene	NC	NC	NC	NC	NC	NC	NC	NC	2.08E-04	NC	2.08E-04
Pentachlorophenol	NC	NC	NC	4.78E-03	NC	4.78E-03	NC	NC	1.89E-02	NC	1.89E-02
Phenol	NC	NC	NC	3.65E-05	NC	3.65E-05	NC	NC	8.00E-07	NC	8.00E-07
Tetrachloroethene	NC	NC	NC	1.83E-04	1.69E-04	3.52E-04	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	4.30E-04	9.23E-03	9.66E-03	NC	NC	NC	NC	NC
Total 2,3,7,8-TCDD TEQ	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total PCBs	NC	NC	NC	NC	NC	NC	2.03E-03	NC	NC	NC	2.03E-03
Trichloroethene	NC	NC	NC	1.27E-04	NC	1.27E-04	NC	NC	3.14E-05	NC	3.14E-05
Vanadium	NC	NC	NC	3.18E-05	NC	3.18E-05	NC	NC	NC	NC	NC
Vinyl chloride	NC	NC	NC	2.62E-05	2.13E-04	2.39E-04	NC	NC	NC	NC	NC
Zinc	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total HI	5.17E-04	NC	5.17E-04	4.06E-02	7.19E-01	7.60E-01	3.21E-03	NC	4.23E-02	1.33E+00	1.38E+00

Notes:
HQ - Hazard Quotient
HI - Hazard Index.
Ing/Derm - Ingestion/Dermal Contact.
MLE - Most Likely Exposure.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.

TABLE 6-20
TOTAL POTENTIAL HAZARD INDEX
CONSTRUCTION WORKER - MLE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Site I					Site L				
	Surface Soil		Groundwater		Total	Surface Soil		Groundwater		Total
Constituent	Ing/Derm.	Inhalation	Ing/Derm.	Inhalation	HQ	Ing/Derm.	Inhalation	Ing/Derm.	Inhalation	HQ
1,1,2,2-Tetrachloroethane	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
1,4-Dichlorobenzene	NC	NC	4.33E-03	NC	4.33E-03	NC	NC	NC	NC	NC
2,4,5-TP (Silvex)	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2,4,6-Trichlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2,4-Dichlorophenol	NC	NC	NC	NC	NC	NC	NC	1.39E-04	NC	1.39E-04
2-Chlorophenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Nitroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
3-Methylphenol/4-Methylphenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4,4-DDE	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Chloroaniline	NC	NC	1.45E-03	NC	1.45E-03	NC	NC	7.03E-05	NC	7.03E-05
4-Methyl-2-pentanone	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Nitroaniline	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
alpha-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Antimony	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Arsenic	NC	NC	NC	NC	NC	1.72E-03	NC	1.55E-02	NC	1.72E-02
Benzene	NC	NC	3.27E-03	7.28E-02	7.61E-02	NC	NC	4.43E-04	6.58E-03	7.03E-03
Benzo(a)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
beta-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Cadmium	NC	NC	3.28E-04	NC	3.28E-04	NC	NC	NC	NC	NC
Carbazole	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chlorobenzene	NC	NC	2.78E-03	1.23E-01	1.26E-01	NC	NC	NC	NC	NC
Chloroform	NC	NC	NC	NC	NC	NC	NC	5.16E-05	2.27E-01	2.28E-01
Cis/Trans-1,2-Dichloroethene	NC	NC	1.41E-04	NC	1.41E-04	NC	NC	NC	NC	NC
Copper	9.20E-03	NC	NC	NC	9.20E-03	NC	NC	NC	NC	NC
delta-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dieldrin	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Heptachlor	NC	NC	6.81E-06	NC	6.81E-06	NC	NC	NC	NC	NC
Heptachlor epoxide	NC	NC	5.86E-04	NC	5.86E-04	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Lead	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Molybdenum	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nickel	NC	NC	1.36E-04	NC	1.36E-04	NC	NC	3.35E-02	NC	3.35E-02
Nitrobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pentachlorophenol	NC	NC	7.80E-04	NC	7.80E-04	NC	NC	NC	NC	NC
Phenol	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Tetrachloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total 2,3,7,8-TCDD TEQ	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total PCBs	9.62E-02	NC	2.51E-02	NC	1.21E-01	1.51E-03	NC	NC	NC	1.51E-03
Trichloroethene	NC	NC	3.30E-05	NC	3.30E-05	NC	NC	NC	NC	NC
Vanadium	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Vinyl chloride	NC	NC	2.99E-04	2.43E-03	2.73E-03	NC	NC	NC	NC	NC
Zinc	NC	NC	2.80E-05	NC	2.80E-05	NC	NC	NC	NC	NC
Total HI	1.05E-01	NC	3.92E-02	1.99E-01	3.43E-01	3.23E-03	NC	4.97E-02	2.34E-01	2.87E-01

Notes:
HQ - Hazard Quotient
HI - Hazard Index.
Ing/Derm - Ingestion/Dermal Contact.
MLE - Most Likely Exposure.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.

TABLE 6-21
TOTAL POTENTIAL CARCINOGENIC RISK
TRESPASSING TEEN - MLE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Site G	Site H				Site I				Site L			
	Groundwater	Surface Soil		Groundwater	Total	Surface Soil		Groundwater	Total	Surface Soil		Groundwater	Total
Constituent	Inhalation Risk	Ing/Derm.	Inhalation	Inhalation	Risk	Ing/Derm.	Inhalation	Inhalation	Risk	Ing/Derm.	Inhalation	Inhalation	Risk
1,1,2,2-Tetrachloroethane	NC	NC	NC	2.66E-12	2.66E-12	NC	NC	NC	NC	NC	NC	NC	NC
4-Methyl-2-pentanone	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Arsenic	NC	6.14E-08	1.03E-10	NC	6.15E-08	NC	NC	NC	NC	8.97E-08	1.01E-10	NC	8.98E-08
Benzene	2.20E-11	NC	NC	4.95E-11	4.95E-11	NC	NC	1.45E-11	1.45E-11	NC	NC	5.50E-13	5.50E-13
Benzo(a)pyrene	NC	NC	NC	NC	NC	8.73E-09	7.69E-13	NC	8.73E-09	3.19E-08	1.43E-12	NC	3.19E-08
Chlorobenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chloroform	NC	NC	NC	3.29E-11	3.29E-11	NC	NC	NC	NC	NC	NC	5.44E-12	5.44E-12
Copper	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	6.32E-09	2.84E-13	NC	6.32E-09
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Tetrachloroethene	8.10E-13	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total 2,3,7,8-TCDD TEQ	NC	2.73E-07	2.41E-11	NC	2.73E-07	1.71E-06	1.98E-10	NC	1.71E-06	NC	NC	NC	NC
Total PCBs	NC	6.99E-09	3.98E-13	NC	6.99E-09	3.31E-07	2.47E-11	NC	3.31E-07	5.19E-09	1.97E-13	NC	5.19E-09
Trichloroethene	2.29E-12	NC	NC	NC	NC	NC	NC	2.72E-12	2.72E-12	NC	NC	NC	NC
Vinyl chloride	1.69E-11	NC	NC	NC	NC	NC	NC	2.60E-10	2.60E-10	NC	NC	NC	NC
Total Risk	4.20E-11	3.41E-07	1.28E-10	8.51E-11	3.42E-07	2.05E-06	2.23E-10	2.78E-10	2.05E-06	1.33E-07	1.02E-10	5.99E-12	1.33E-07

Notes:
Ing/Derm - Ingestion/Dermal Contact.
MLE - Most Likely Exposure.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.

TABLE 6-22
TOTAL POTENTIAL HAZARD INDEX
TRESPASSING TEEN - MLE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Site G	Site H				Site I				Site L			
	Groundwater	Surface Soil		Groundwater	Total	Surface Soil		Groundwater	Total	Surface Soil		Groundwater	Total
	Inhalation HQ	Ing/Derm.	Inhalation	Inhalation	HQ	Ing/Derm.	Inhalation	Inhalation	HQ	Ing/Derm.	Inhalation	Inhalation	HQ
1,1,2,2-Tetrachloroethane	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4-Methyl-2-pentanone	6.23E-08	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Arsenic	NC	8.68E-04	NC	NC	8.68E-04	NC	NC	NC	NC	1.27E-03	NC	NC	1.27E-03
Benzene	1.07E-05	NC	NC	2.41E-05	2.41E-05	NC	NC	7.04E-06	7.04E-06	NC	NC	2.67E-07	2.67E-07
Benzo(a)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chlorobenzene	2.57E-06	NC	NC	6.37E-06	6.37E-06	NC	NC	7.70E-06	7.70E-06	NC	NC	NC	NC
Chloroform	NC	NC	NC	4.58E-05	4.58E-05	NC	NC	NC	NC	NC	NC	7.58E-06	7.58E-06
Copper	NC	NC	NC	NC	NC	6.84E-03	NC	NC	6.84E-03	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	9.01E-08	9.01E-08	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	1.24E-06	NC	NC	2.65E-06	2.65E-06	NC	NC	NC	NC	NC	NC	NC	NC
Tetrachloroethene	2.26E-08	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Toluene	4.25E-07	NC	NC	1.60E-08	1.60E-08	NC	NC	NC	NC	NC	NC	NC	NC
Total 2,3,7,8-TCDD TEQ	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total PCBs	NC	1.11E-03	NC	NC	1.11E-03	5.27E-02	NC	NC	5.27E-02	8.25E-04	NC	NC	8.25E-04
Trichloroethene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Vinyl chloride	2.44E-07	NC	NC	NC	NC	NC	NC	3.77E-06	3.77E-06	NC	NC	NC	NC
Total	1.53E-05	1.98E-03	NC	7.90E-05	2.06E-03	5.95E-02	NC	1.85E-05	5.96E-02	2.09E-03	NC	7.85E-06	2.10E-03

Notes:
HI - Hazard Index.
HQ - Hazard Quotient.
Ing/Derm - Ingestion/Dermal Contact.
MLE - Most Likely Exposure.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.

TABLE 6-23
TOTAL POTENTIAL CARCINOGENIC RISK
RECREATIONAL TEEN - MLE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Dead Creek and Borrow Pit Lake Sediment		
	Wading	***Swimming (a)***	***Total Risk***
Arsenic	4.50E-08	2.25E-08	6.75E-08
Total PCBs	1.17E-08	5.87E-09	1.76E-08
Total Risk	5.68E-08	2.84E-08	8.51E-08

Notes:
MLE - Most Likely Exposure.
(a) - Based on exposure scenario assumptions, swimming potential risk is equal to 1/2 wading potential risk.

TABLE 6-24
TOTAL POTENTIAL HAZARD INDEX
RECREATIONAL TEEN - MLE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Dead Creek and Borrow Pit Lake Sediment		
	Wading	**Swimming (a)**	**Total HQ**
Arsenic	6.37E-04	3.18E-04	9.55E-04
Total PCBs	1.87E-03	9.34E-04	2.80E-03
Total HI	2.50E-03	1.25E-03	3.76E-03

Notes:
HI - Hazard Index.
HQ - Hazard Quotient.
MLE - Most Likely Exposure.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
(a) - Based on exposure scenario assumptions, swimming potential risk is equal to 1/2 wading potential risk.

TABLE 6-25
TOTAL POTENTIAL CARCINOGENIC RISK
RECREATIONAL FISHER - MLE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Dead Creek and Borrow Pit Lake		
Constituent	**Sediment**	**Fish**	**Total Risk**
Arsenic	6.54E-09	1.24E-06	1.25E-06
Total PCBs	2.69E-09	NC	2.69E-09
Total Risk	9.22E-09	1.24E-06	1.25E-06

Notes:
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
MLE - Most Likely Exposure.

TABLE 6-26
TOTAL POTENTIAL HAZARD INDEX
RECREATIONAL FISHER - MLE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Dead Creek and Borrow Pit Lake		
Constituent	**Sediment**	**Fish**	**Total HQ**
Arsenic	1.13E-04	2.14E-02	2.15E-02
Total PCBs	5.23E-04	NC	5.23E-04
Total HI	6.36E-04	2.14E-02	2.21E-02

Notes:
HI - Hazard Index.
HQ - Hazard Quotient.
MLE - Most Likely Exposure.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.

TABLE 6-27
TOTAL POTENTIAL CARCINOGENIC RISK
RESIDENTIAL RECEPTORS - MLE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Site N			Transect 3			Transect 4		
Constituent	**Surface Soil**	**Inhalation**	**Total Risk**	**Surface Soil**	**Inhalation**	**Total Risk**	**Surface Soil**	**Inhalation**	**Total Risk**
Arsenic	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	NC	NC	2.50E-08	4.68E-13	2.50E-08
Benzo(a)pyrene	6.68E-08	1.88E-12	6.68E-08	4.89E-08	9.17E-13	4.89E-08	2.11E-07	3.95E-12	2.11E-07
Benzo(b)fluoranthene	NC	NC	NC	5.71E-09	1.07E-13	5.71E-09	2.14E-08	4.01E-13	2.14E-08
Dibenzo(a,h)anthracene	2.59E-08	7.27E-13	2.59E-08	2.50E-08	4.68E-13	2.50E-08	4.64E-08	8.70E-13	4.64E-08
Dieldrin	NC	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	1.29E-08	2.41E-13	1.29E-08
Total:	9.27E-08	2.60E-12	9.27E-08	7.96E-08	1.49E-12	7.96E-08	3.16E-07	5.93E-12	3.16E-07

Notes:
MLE - Most Likely Exposure.
NC - Not Calculated, no dose-response value, or not a constituent of potential concern in this area/medium.

TABLE 6-27
TOTAL POTENTIAL CARCINOGENIC RISK
RESIDENTIAL RECEPTORS - MLE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Transect 5			Transect 6			Transect 7			
	Surface Soil	Inhalation	Total Risk	Surface Soil	Inhalation	Total Risk	Surface Soil	Inhalation	Produce	Total Risk
Arsenic	NC	NC	NC	NC	NC	NC	5.83E-07	3.23E-10	2.87E-06	3.45E-06
Benzo(a)anthracene	NC	NC	NC	2.16E-08	4.05E-13	2.16E-08	1.22E-08	2.29E-13	NC	1.22E-08
Benzo(a)pyrene	4.93E-08	9.23E-13	4.93E-08	1.80E-07	3.37E-12	1.80E-07	1.34E-07	2.50E-12	NC	1.34E-07
Benzo(b)fluoranthene	NC	NC	NC	2.26E-08	4.24E-13	2.26E-08	1.45E-08	2.72E-13	NC	1.45E-08
Dibenzo(a,h)anthracene	3.52E-08	6.60E-13	3.52E-08	4.21E-08	7.90E-13	4.21E-08	3.68E-08	6.89E-13	NC	3.68E-08
Dieldrin	3.38E-08	5.49E-13	3.38E-08	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	7.86E-09	1.47E-13	7.86E-09	8.57E-09	1.61E-13	NC	8.57E-09
Total:	1.18E-07	2.13E-12	1.18E-07	2.74E-07	5.14E-12	2.74E-07	7.89E-07	3.27E-10	2.87E-06	3.65E-06

Notes:
MLE - Most Likely Exposure.
NC - Not Calculated, no dose-response value, or not a constituent of potential concern in this area/medium.

TABLE 6-28
TOTAL POTENTIAL HAZARD INDEX
RESIDENTIAL RECEPTORS - MLE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Site N			Transect 3			Transect 4		
Constituent	**Surface Soil**	**Inhalation**	**Total HQ**	**Surface Soil**	**Inhalation**	**Total HQ**	**Surface Soil**	**Inhalation**	**Total HQ**
Arsenic	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dieldrin	NC	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total HI:	NC	NC	NC	NC	NC	NC	NC	NC	NC

Notes:
HI - Hazard Index.
HQ - Hazard Quotient.
MLE - Most Likely Exposure.

NC - Not Calculated, no dose-response value, or not a constituent of potential concern in this area/medium.

TABLE 6-28
TOTAL POTENTIAL HAZARD INDEX
RESIDENTIAL RECEPTORS - MLE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Transect 5			Transect 6			Transect 7			
Constituent	**Surface Soil**	**Inhalation**	**Total HQ**	**Surface Soil**	**Inhalation**	**Total HQ**	**Surface Soil**	**Inhalation**	**Produce**	**Total HQ**
Arsenic	NC	NC	NC	NC	NC	NC	3.26E-02	NC	9.12E-03	4.17E-02
Benzo(a)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dieldrin	1.04E-03	NC	1.04E-03	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total HI:	1.04E-03	NC	1.04E-03	NC	NC	NC	3.26E-02	NC	9.12E-03	4.17E-02

Notes:
HI - Hazard Index.
HQ - Hazard Quotient.
MLE - Most Likely Exposure.

NC - Not Calculated, no dose-response value, or not a constituent of potential concern in this area/medium.

7.0 SHORT-TERM RISK ASSESSMENT

As discussed in the HHRA workplan (Appendix A), a short term risk assessment has been conducted for the site. Short-term exposure generally poses less of a health risk than longer-term (chronic) exposure to the same environmental concentration of a constituent. Therefore, generally only those constituents that result in risk levels greater than the risk targets in the baseline risk assessment are evaluated for potential short-term health effects. Since short-term health evaluations are not a standard component of most hazardous waste site health evaluations, limited guidance exists for performing these types of evaluations.

The purpose of the short-term risk assessment is to determine if concentrations of constituents at the site are present at high enough concentrations to pose an acute risk to current receptors. A short-term risk may exist where constituent concentrations are greater than 100 times the appropriate screening criteria (direct-contact scenarios only).

7.1 Methodology for Selection of Constituents of Potential Concern for Short-Term Exposure

Short-term COPCs (STCOPCs) for the short-term risk assessment were selected through the use of a toxicity screen for an acute scenario, as discussed in the HHRA workplan (Appendix A).

7.1.1 Toxicity Screen

The same screening criteria identified in Section 3.1.1.1 were employed for the STCOPC selection. As discussed in the HHRA workplan (Appendix A), the screening criteria were multiplied by 100 and compared to the average concentration. Appendix C presents the screening values used for the residential soil – direct contact screen, the industrial soil – direct contact screen, the groundwater and surface water screen, the air screen, and the fish tissue screen.

7.1.1.1 Screening Methodology

Constituents in an area/medium with average concentrations less than or equal to the screening criteria multiplied by 100 were not included as STCOPCs. Where no STCOPCs are identified for an area/medium, that area/medium is not evaluated in the short-term HHRA.

7.2 Hazard Identification

This section presents the results of the STCOPC selection by medium and area.

7.2.1 Soils

Data for soils were compared to both residential and industrial direct contact screening values.

7.2.1.1 Residential Scenario Direct Contact Screen

Average constituent concentrations in surface soil in all seven transects and for Site N were compared to residential soil screening values for direct contact multiplied by 100. The comparison is presented in the last column of the screening tables presented in Appendix E.

Transects. No residential scenario STCOPCs were identified in surface soil for the transects.

Sites. No residential scenario STCOPCs were identified in surface soil for Site N.

7.2.1.2 Industrial Scenario Direct Contact Screen

Average constituent concentrations in surface soil and subsurface soil in all transects and surface soil in all sites were compared to industrial screening values for direct contact multiplied by 100. The comparison is presented in the last column of the screening tables presented in Appendix F.

Transects. No industrial scenario STCOPCs were identified in surface soil or subsurface soil for the transects.

Sites. No industrial scenario STCOPCs were identified in surface soil for the fill areas.

7.2.1.3 Soil STCOPC Summary

No direct contact STCOPCs for either a residential or industrial scenario were identified for either the transects or the sites. Therefore, surface and subsurface soils in these areas will not be further evaluated in the short-term risk assessment.

7.2.2 Groundwater

The selection of STCOPCs for groundwater was conducted on a location-by-location basis. The screening tables are presented in Appendix H, which lists each well included in the analysis. Screening intervals and/or sample depths are also included where known. The Illinois Class II Groundwater Criteria multiplied by 100 and a comparison of that value to the average concentration in the well are presented in the last two columns of each table.

As noted above and in the HHRA Workplan, a drinking water scenario would only be included in the risk assessment if it was determined that groundwater was being used as a sole source of drinking water for any of the residences in the study area that are downgradient of the fill areas. Private wells in the study area are either not used or are used for outdoor household activities. Moreover, the Villages of Sauget and Cahokia have ordinances in effect that prevent the use of groundwater as a potable water supply source (see Appendix S). Therefore, a drinking water scenario is not included in the short-term risk assessment. STCOPCs were identified to evaluate potential incidental exposures to groundwater (i.e., non-drinking water scenarios), including incidental contact by a construction worker that may excavate to a depth where groundwater would be exposed in the excavation, or potential volatilization of VOCs through the soil column to indoor or outdoor air. As noted above, the groundwater concentrations are compared to TACO Tier 1 Class II Groundwater Remediation Objectives (presented in Appendix C).

A 30-foot bgs excavation depth is assumed as some sewer lines in the area are at that depth. Moreover, volatilization from groundwater through the soil column to indoor and/or outdoor air is generally assumed to occur up to depths of 15 feet bgs (MADEP, 1995). Therefore, wells and or groundwater samples with screening intervals or sample collection depths between 0 and 30 feet bgs were included in the evaluation.

A total of 34 groundwater sampling locations were included in the evaluation. Of these, 19 sampling locations are existing wells from previous investigations (those beginning with EE and EEG designations), 11 are new push sampling locations installed in support of the SSP (those beginning with AA and SGW designations), and four sampling locations are existing residential area non-potable use wells (those beginning with DW designations).

The results of the STCOPC selection for groundwater are presented in Table 7-1. Of the 34 sampling locations, STCOPCs were identified in only six locations from Sites G, H, I, and L. No STCOPCs were identified in the residential (non-potable) wells. Five locations have only one or two STCOPCs identified, and one well (EEG-107, Site G) has seven STCOPCs identified. There appears to be no clear pattern of STCOPCs between locations. A total of nine STCOPCs were identified in the six locations combined. Of these, three are VOCs.

The nine STCOPCs were also evaluated in the chronic risk assessment as chronic COPCs. The groundwater scenarios included in the chronic risk assessment include the following:

- Incidental ingestion and dermal contact (future construction worker)
- Inhalation of VOCs – excavation air (future construction worker)
- Inhalation of VOCs – indoor air (current indoor industrial worker)
- Inhalation of VOCs – outdoor air (current outdoor industrial worker, trespassing teenager)

Concentrations of VOCs in groundwater were used to calculate indoor air, excavation air, and outdoor air concentrations for the above scenarios in Appendices K (indoor air), L (excavation air), and M (outdoor air). These calculated concentrations are compared to 100 times the USEPA Region 9 air PRGs (USEPA, 1999) in Table 7-2. As indicated on the table, air concentrations of all constituents are less than 100 times the USEPA Region 9 air PRGs (which are protective of residential exposure) with the exception of benzene and chloroform in excavation air. Therefore, concentrations of these constituents are compared to short-term air screening levels, as discussed in the HHRA workplan (Appendix A) in Table 7-3. The short-term screening levels were obtained from the following sources:

- Threshold Limit Value (TLVs) and Biological Exposure Indices (BEIs). The American Conference of Governmental Industrial Hygienists (ACGIH, 2000).
- National Institute for Occupational Health and Safety (NIOSH) Pocket Guide to Chemical Hazards. http://www.cdc.gov/niosh/npg/pgdstart.html (NIOSH, 2000).
- Texas Natural Resource Conservation Commission (TNRCC) Effects Screening Levels (ESLs) July 19, 2000 (TNRCC, 2000).

The calculated excavation air concentrations of both benzene and chloroform are below the TLVs and NIOSH short-term air standards (Table 7-3). The concentration of benzene exceeds the short-term TNRCC ESL. Although the excavation air concentration of benzene exceeds the TNRCC short-term standard, this does not necessarily indicate that a short-term risk is present. The TNRCC ESLs are very conservative and the exceedance of the benzene short-term ESL is slight. In addition, the excavation air scenario is a potential future scenario; there are no current excavation trenches at the site.

The six non-VOC STCOPCs were evaluated in the chronic risk assessment in a future construction worker scenario. As indicated on Tables 6-5 and 6-6, none of these six constituents have a potential cancer risk or an HQ that exceeds the target levels. Therefore, it is concluded that neither a chronic nor an acute risk exists for these constituents.

Therefore, it is concluded that concentrations in groundwater are not posing a current short-term risk to receptors at the site.

7.2.3 Sediment

Average constituent concentrations in sediment in the combined CS-F/Borrow Pit Lake area were compared to 100 times the residential soil screening values for direct contact. This screen is presented in the last column of the sediment screening table presented in Appendix E.

No STCOPCs were identified in sediment, and sediment is therefore not evaluated further in the short-term risk assessment.

7.2.4 Surface Water

Average constituent concentrations in surface water in the combined CS-F/Borrow Pit Lake area were compared to 100 times the screening values for groundwater. The screening table is presented in Appendix I; the comparison of the average concentration to 100 times the screening value is presented in the last column. Based on this screen, no STCOPCs were identified in surface water. Therefore, surface water is not evaluated further in the short-term risk assessment.

7.2.5 Fish Fillet

The selection of COPCs for fish fillet samples was conducted on a sample-by-sample basis in Section 3. The screening table is presented in Appendix I. As shown in the table, only one COPC, arsenic, was identified in fish tissue. Arsenic was detected in only one of the three fish tissue samples analyzed for arsenic at a concentration of 0.45 mg/kg. The RBC for fish tissue is 0.002 mg/kg; 100 times this value is 0.2 mg/kg. The arsenic concentration of 0.45 mg/kg is greater than 100 times the RBC. Therefore, arsenic in fish fillet is identified as a STCOPC for the short-term risk assessment.

Arsenic in fish fillet was evaluated in the chronic risk assessment for a recreational fisher. In the RME scenario, it was assumed that a recreational fisher ingests 8 grams of fish per day, every day, for 30 years. The results of the chronic risk assessment for potential carcinogenic effects indicate that the potential risk for the recreational fisher (RME scenario) due to arsenic in fish fillet is 3.3×10^{-5} (Table 6-11). This is within the USEPA target risk range of 10^{-6} to 10^{-4}. The results for chronic noncarcinogenic risk assessment indicate that the HQ for ingestion of arsenic in fish fillet is 0.17 (Table 6-12). This is below the USEPA target HQ of 1. It should be noted that the fish tissue samples collected here were analyzed for total arsenic. Arsenic can exist in organic and inorganic forms; the organic forms are less, and in some cases much less, toxic than the inorganic forms (ATSDR, 1998). It is well known that arsenic in aquatic organisms is predominantly present in organic forms; recent quantitative analysis of inorganic and organic forms of arsenic in food stuffs indicates that inorganic arsenic represented less than 1% of total arsenic in freshwater finfish, tuna, saltwater finfish and shrimp (Schoof, et al., 1999). The screening values (USEPA Region 3 RBCs) and the USEPA toxicity values used to evaluate arsenic in fish tissue assume all arsenic is in the inorganic form. Therefore, it is likely that the chronic risk estimates for arsenic in fish tissue greatly overestimate actual risk. In addition, the identification of arsenic as a STCOPC is also not appropriate due to these considerations.

Therefore, based on the results of the risk assessment, it is concluded that a chronic risk is not present for arsenic in fish fillet. Therefore, it is also concluded that a short-term (acute) risk does not exist for arsenic in fish fillet.

7.2.6 Air

Ambient air sampling was conducted at Sites G, H, I and L to determine the tendency of site constituents to enter the atmosphere and local wind patterns. At Site G, air samples were collected at two upwind and two downwind locations. At Sites H, I, and L, air samples were collected at one upwind and two downwind locations. Figure 3-7 identifies the ambient air sampling locations.

Air samples were analyzed for VOCs, SVOCs, PCBs, dioxins, and metals. Appendix J (Table J-6) presents the comparison of average air concentrations in to 100 times the PRGs for ambient air (USEPA, 1999).

Methylene chloride is the only constituent identified as an STCOPC in air. It should be noted that methylene chloride is a common laboratory contaminant, however, review of the field blank data did not clearly indicate a problem with sample collection or analysis. Methylene chloride was identified as a COPC in all four sites. However, the numerical results are sporadic (see Appendix J). For example, in each downwind sample pair, methylene chloride was detected at a high concentration in one sample, and not detected or detected at a much lower concentration in the second downwind sample. As samples were collected from all areas on the same day, such spikes would not be expected. Moreover, methylene chloride was not identified as a COPC in sites soils or groundwater. Therefore, although it is not indicated by the sample blank evaluations, laboratory contamination appears to be the most likely source of methylene chloride in these samples.

As noted in the HHRA Workplan, and because these data represent a single 24-hour snapshot of air quality, they are not used for further risk calculations, and methylene chloride is not considered to be present.

7.2.7 Summary of STCOPC

Based on the analysis of short-term risk presented above, it is concluded that no short-term (acute) risks are posed at the site.

TABLE 7-1
SUMMARY OF CONSTITUENTS OF POTENTIAL CONCERN
GROUNDWATER - SHORT TERM EXPOSURE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Site	G	H		I		L
Constituent * Location	**EEG-107**	**EE-01**	**EE-02**	**AA-I-S1**	**EE-12**	**EEG-109**
1,1,2,2-Tetrachloroethane *	--	X	--	--	--	--
2,4-Dichlorophenol	X	--	--	--	--	--
4-Chloroaniline	X	--	--	X	--	--
Benzene *	X	--	--	--	--	--
Chloroform *	--	--	X	--	--	X
delta-BHC	X	--	--	--	--	--
Pentachlorophenol	X	X	X	--	--	--
Phenol	X	--	--	--	--	--
Total 2,3,7,8-TCDD TEQ	X	--	--	--	X	--
Total:	**7**	**2**	**2**	**1**	**1**	**1**

Notes:
-- This constituent was not identifed as a constituent of potential concern based on this screen.
* Indicates volatile organic compound (VOC).

TABLE 7-2
COMPARISON OF CALCULATED AIR CONCENTRATIONS FOR VOCs TO PRGs
GROUNDWATER - SHORT TERM EXPOSURE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Site	G			H				I		L				
Air	Indoor	Outdoor	Excavation (b)	Indoor	Outdoor	Excavation (b)				Indoor	Outdoor	Excavation (b)		100 Times
Constituent * Location	(a)	(a)	EEG-107	(a)	(a)	EE-01	EE-02	AA-I-S1	EE-12	(a)	(a)	EEG-109	Air PRG (c)	Air PRG (c)
VOCs														
1,1,2,2-Tetrachloroethane *			--	2.24E-07	5.50E-08	2.80E-04	--	--	--			--	3.30E-05	3.30E-03
Benzene *	4.45E-04	1.20E-05	**1.00E-01**			--	--	--	--			--	2.50E-04	2.50E-02
Chloroform *			--	4.72E-05	2.60E-06	--	**1.16E-02**	--	--	6.49E-06	4.30E-06	2.08E-03	8.40E-05	8.40E-03

Notes:
-- This constituent was not identifed as a constituent of potential concern based on the short-term groundwater screen.
PRG - Preliminary Remediation Goal.
VOC -Volatile Organic Compound.
(a) - Calculated based on average groundwater concenentration in this area. Units = mg/m^3.
(b) - Excavation air concentrations calculated based on average concentration in each well. Units = mg/m^3.
(c) - See Appendix C Table C-5 for references. Concentrations greater than 100 times the PRG are shaded.

TABLE 7-3
COMPARISON OF CALCULATED VOC AIR CONCENTRATIONS TO SHORT TERM ACTION LEVELS
GROUNDWATER - SHORT TERM EXPOSURE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Site Location	G - Excavation Air	H - Excavation Air	TLVs (a)	NIOSH (b)		TNRCC ESL (c)
	EEG-107	EE-02	STEL	TWA-STEL	PEL-STEL	Short-term
Constituent	(mg/m^3)	(mg/m^3)	(mg/m^3)	(mg/m^3)	(mg/m^3)	(mg/m^3)
Benzene	0.1 (e)	--	7.987	3.19	15.95	0.075
Chloroform	--	0.0116	NA	9.78 (d)	NA	0.098

Notes:
-- This constituent was not identifed as a constituent of potential concern based on the short-term groundwater screen.
Shading indicates that the concentration is above the Long-Term TNRCC ESL.
BEI - Biological Exposure Indices.
ESL - Effects Screening Level.
NIOSH - National Institute for Occupational Health and Safety.
PEL - Permissible Exposure Limit.
STEL - Short-Term Exposure Limit. The concentration to which it is believed that workers can be exposed continuously for a short period without adverse effect. It is defined as a 15-minute TWA exposure which should not be exceeded at any time during the workday, unless otherwise stated.
TLV - Threshold Limit Value.
TNRCC - Texas Natural Resource Conservation Commission.
TWA - Time Weighted Average. Concentration for a 10-hour day and 40-hour workweek, to which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse effect.
VOC - Volatile Organic Compound.
(a) - TLVs and BEIs. The American Conference of Governmental Industrial Hygienists (ACGIH, 2000).
(b) - NIOSH Pocket Guide to Chemical Hazards. http://www.cdc.gov/niosh/npg/pgdstart.html
(c) - TNRCC Effects Screening Levels. July 19, 2000. Short-term indicates a 1 hour averaging period.
(d) - 60-minute STEL.
(e) - Concentration exceeds Short Term (1-hour average) TNRCC ESL.

8.0 SUMMARY AND CONCLUSIONS

This report has presented the baseline human health risk assessment (HHRA) and the stream-lined short-term risk assessment for Sauget Area 1, located in Sauget and Cahokia, Illinois. It is Volume II of the RI/SC for Sauget Area 1 (in preparation). The environmental evaluations of Sauget Area 1 are being conducted as an EE/CA for the Sauget Area 1 sites and soil, sediment, surface water and air, and for the RI/FS for Sauget Area 1 groundwater. The HHRA was conducted to satisfy the SOW for the EE/CA and RI/FS (specifically Task 4 Section 2.5 and Task 5 Section 2 of the SOW) provided as an attachment to the AOC entered into by the USEPA and Solutia, as well as to be compliant with the NCP (USEPA, 1990).

The HHRA and the short-term risk assessment were conducted in accordance with the USEPA-approved HHRA Workplan dated June 25, 1999 (including the August 6, 1999 revised pages), which was submitted as Volume 1B of the SSP for Sauget Area 1 (Solutia, 1999). The HHRA Workplan is provided as Appendix A to this report.

The HHRA and the short-term risk assessment were conducted using data from environmental samples collected from the study area (shown in Figure 1-1 and described in more detail in Section 2) in accordance with the USEPA-approved SSP. The SSP for Sauget Area 1 was designed to investigate three major areas of the Sauget Area 1 study area (the media sampled in each are identified in parenthesis):

- The Sites G, H, I, L, M, and N (waste, surface soil, groundwater, sediment, surface water, ambient air);
- Dead Creek and its environs including creek segments CS-B, CS-C, CS-D, CS-E, and CS-F, which includes the Borrow Pit Lake (sediment, surface water and fish tissue); and
- The residential/commercial/undeveloped areas adjacent to Dead Creek, evaluated as Transects 1, 2, 3, 4, 5, 6, and 7 (surface soil, subsurface soil, and groundwater).

Background or reference samples were collected for surface soil, subsurface soil, groundwater, surface water, sediment, fish tissue, and ambient air. The SSP identified the suites of analytes for each medium. The analytes included in the risk assessment are: VOCs, SVOCs, metals, mercury, cyanide, PCBs, pesticides, herbicides, and dioxins. Validated laboratory analytical data are compiled in the Data Validation Report (Solutia, 2000a), and field data are compiled in the Field Sampling Report (Solutia, 2000b).

On May 31, 2000, the USEPA issued a UAO to Monsanto Company and Solutia Inc. (Docket No. V-W-99-C-554) pursuant to section 106(a) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 as amended, 42 U.S.C. Section 9606(a). The Order requires, among other things, a sediment removal action at Sauget Area 1 Creek Segments B and Fill Area M and Creek Segments C, D and E and the portion of Creek Segment F between Creek Segment E and Route 3, which are located in Sauget and Cahokia, Illinois. Therefore, these areas were not further evaluated in the risk assessment.

The baseline HHRA has been conducted in accordance with the four-step paradigm for human health risk assessments developed by USEPA (USEPA, 1989a); these steps are:

- Data Evaluation and Hazard Identification
- Toxicity Assessment
- Exposure Assessment
- Risk Characterization

The risk assessment results are summarized by step below.

8.1 Data Evaluation and Hazard Identification

The purpose of the data evaluation and hazard identification process is two-fold: 1) to evaluate the nature and extent of release of constituents present at the site; and 2) to select a subset of these constituents identified as COPCs for quantitative evaluation in the risk assessment. This step of the risk assessment involves compiling and summarizing the data for the risk assessment, and selecting COPCs based on a series of screening steps. Several factors are typically considered in selecting COPCs for a site, including natural background, frequency of detection, and toxicity, including essential nutrient status.

Per the HHRA Workplan, IEPA TACO Tier I criteria (IEPA, 1998) were used for the identification of COPCs for soil and groundwater for quantitative evaluation in the risk assessment. Where IEPA TACO Tier I criteria were not available, USEPA Region 9 PRGs (1999) were used. Residential values were used to identify COPCs for transect soils and sediments, and industrial values were used to evaluate transect and site soils. The TACO program also provides screening criteria for the groundwater ingestion component of the soil to groundwater pathway that were used here. These latter values conservatively address leaching of constituents from soils to underlying groundwater.

IEPA TACO Tier I values are not available for surface water, fish tissue, or air. Hence, surface water data were compared to the groundwater criteria. Fish tissue data were compared to the USEPA Region 3 RBCs for fish (USEPA, 2000b). Air concentrations were compared to USEPA Region 9 PRGs (USEPA, 1999) for ambient air.

Background samples were collected in the vicinity of the site to provide information on naturally-occurring levels of constituents typical for the local area. The purpose of comparing site conditions to local background is to determine if site concentrations of constituents are representative of background concentrations, which, therefore, should not be included in risk calculations. Background comparisons were conducted for each medium using site-specific background data.

The procedure for determining whether a constituent concentration is consistent with background follows that developed by USEPA Region 4 (USEPA, 2000a) and presented in the HHRA Workplan (Appendix A). Maximum detected concentrations of constituents in environmental media at the site were compared to two times the arithmetic mean site-specific background concentration. Therefore, if maximum concentrations of constituents in an area are found to be less than two times the average background concentrations, then those constituents are eliminated from quantitative evaluation in the risk assessment.

In the screening process, constituents in an area/medium with maximum concentrations less than or equal to the screening criteria were not included as COPCs. Where no COPCs are identified for an area/medium, that area/medium was not evaluated quantitatively in the HHRA.

No COPCs were identified in surface water. Therefore, surface water was not further evaluated in the risk assessment. No direct contact COPCs for either a residential or industrial scenario were identified for Transect 1, Transect 2, or Site G. Therefore, surface and subsurface soils in these areas were not further evaluated in the risk assessment.

The majority of the COPCs identified in surface and subsurface soils in the transects and in Site N (five of seven) are PAHs (Tables 3-1 and 3-2). Of the remaining two COPCs, dieldrin was identified as a COPC in Transect 5 surface soil for the residential scenario, and arsenic was identified as a COPC in Transect 7 surface soil for both the residential and industrial scenarios.

PAHs are common combustion products and are found in grilled foods, charcoal, and in motor oils and asphalt paving (ATSDR, 1995). A paper entitled "Background Levels of Polycyclic Aromatic Hydrocarbons (PAH) and Selected Metals in New England Urban Soils" (Bradley et al., 1994) investigated the occurrence of PAHs in soils in three New England towns: Boston, MA; Providence, RI; and Springfield, MA. Samples were collected in non-industrial areas. PAH concentrations were consistently higher than residential screening criteria. Higher PAH concentrations were found near roadways and near telephone poles. Comparison of the PAH concentrations reported in the paper with those concentrations detected in Transect 3, 4, 5, 6, and 7 surface soils indicates that the transect concentrations are similar to those presented in the paper, i.e., are consistent with urban background.

Arsenic was identified as a COPC in surface soils in Transect 7. Of the nine surface soil samples collected in this transect, eight had concentrations ranging from 6.2 to 8.1 mg/kg, below the site-specific background concentration of 19 mg/kg. However, one sample in Transect 7 (UAS-T7-S1-0-0.5FT) had an arsenic concentration of 34 mg/kg. Because this maximum detected value is greater than the background concentration, arsenic was identified as a COPC in Transect 7. Although the majority of the COPCs identified in the transect soils are likely consistent with background concentrations, they have all been quantitatively evaluated in the risk assessment.

The COPCs identified in the industrial scenario for surface soils in the fill areas are PAHs, arsenic, and copper, PCBs and TCDD-TEQs. These are all quantitatively evaluated in the risk assessment.

The selection of COPCs for groundwater was conducted on a location-by-location basis. Samples with screening intervals or sample collection depths between 0 and 30 feet bgs were included in the evaluation. Because groundwater in the area is not used a source of drinking water (see Appendix S), exposure to COPCs in groundwater could occur due to either volatilization of COPCs into indoor or outdoor air, or contact with COPCs in groundwater exposed in an excavation trench. A 30-foot bgs excavation depth is assumed as some sewer lines in the area are located at that depth. Moreover, volatilization from groundwater through the soil column to indoor and/or outdoor air is generally assumed to occur up to depths of up to 15 feet bgs (MADEP, 1995). Based on these considerations, a total of 34 groundwater sampling locations were included in the evaluation. Of these, 19 locations are existing wells from previous investigations (those beginning with EE and EEG designations), 11 are push sampling locations installed in support of the SSP (those beginning with AA and SGW designations), and four locations are existing residential area non-potable use wells (those beginning with DW designations).

The results of the COPC selection for groundwater are presented in Table 3-5. Of the 34 groundwater sampling locations, COPCs were identified in only 14. Five locations have only one or two COPCs identified. Seven locations have between six and 11 COPCs identified, and two locations have 17 and 19 COPCs identified; these are in Sites G and H, respectively. There appears to be no clear pattern of COPCs between locations. A total of 42 COPCs were identified in the 14 groundwater sampling locations combined. Of these, 12 are VOCs. Of the four residential area non-potable use wells, a single COPC, lead, was identified in only one well (DW-MCDO). This is the only COPC identified in the approximately 10 locations located south of Site L, and lead was not identified as a COPC in any other well included in the evaluation.

Two COPCs, arsenic and PCBs, were identified in sediment, as shown in Table 3-6. One COPC was identified in fish tissue – arsenic, as shown on Table 3-6. Arsenic was detected in only one of the three fish tissue samples analyzed for arsenic. No COPCs were identified in surface water. Therefore, surface water is not evaluated further in the risk assessment.

8.2 Dose-Response Assessment

The purpose of the dose-response assessment is to identify the types of adverse health effects a constituent may potentially cause, and to define the relationship between the dose of a constituent and the likelihood or magnitude of an adverse effect (response) (USEPA, 1989a). Adverse effects are classified by USEPA as potentially carcinogenic or noncarcinogenic (i.e., potential effects other than cancer). Dose-response relationships are defined by USEPA for oral exposure and for exposure by inhalation. Oral toxicity values are also used to assess dermal exposures, with appropriate adjustments, because USEPA has not yet developed values for this route of exposure. Combining the results of the toxicity assessment with information on the magnitude of potential human exposure provides an estimate of potential risk.

Sources of the published toxicity values in this risk assessment include USEPA's Integrated Risk Information System (IRIS) (USEPA, 2000c), the Health Effects Assessment Summary Tables (HEAST) (USEPA, 1997b), and the USEPA National Center for Environmental Assessment (NCEA) in Cincinnati, Ohio.

Risks were calculated for 2,3,7,8-TCDD and the dioxin and furan congeners using the cancer slope factor for 2,3,7,8-TCDD listed in HEAST and using the TEFs provided by WHO (Van den Berg et al., 1998), presented in Table 4-6. The TEFs are fractions that equate the potential toxicity of each congener to that of 2,3,7,8-TCDD.

8.3 Exposure Assessment

The purpose of the exposure assessment is to predict the magnitude and frequency of potential human exposure to each of the COPC retained for quantitative evaluation in the HHRA. The first step in the exposure assessment process is the characterization of the setting of the site and surrounding area. Current and potential future site uses and potential receptors (i.e., people who may contact the impacted environmental media of interest) are then identified. Potential exposure scenarios identifying appropriate environmental media and exposure pathways for current and potential future site uses and receptors are then developed. Those potential exposure pathways for which COPCs are identified and are judged to be complete are evaluated quantitatively in the risk assessment.

8.3.1 Conceptual Site Model

To guide identification of appropriate exposure pathways for evaluation in the risk assessment, a CSM for human health was developed. The purpose of the CSM is to identify source areas, potential migration pathways of constituents from source areas to environmental media where exposure can occur, and to identify potential human receptors.

The CSM for the Sauget Area 1 risk assessment is presented in Figure 5-1. The CSM identifies potential sources, constituent migration pathways from one medium to another, and potential exposure pathways (e.g., soil, groundwater), potential exposure routes (e.g., ingestion, inhalation), and potential receptors (e.g., worker, resident). Historical evidence presented in the SSP demonstrates that the major source of COPCs in surface water and sediments in Dead Creek was industrial and municipal discharges directly to the creek. There are no current discharges to the creek other than stormwater.

Surface and subsurface soil samples were collected and analyzed from transects in the residential/commercial/undeveloped areas. The SSP sampling program for this area was developed to address the potential for sediments in Dead Creek to serve as a source of constituents to soils in the surrounding flood plain via overbank flooding. Transects were located on alternating sides of Dead Creek from the sites south to Route 3 (Figure 3-1), with the intention of determining if there was a north to south concentration gradient of constituents. Sampling locations on the transects extended out east or west of the creek, with the intention of determining if there was a concentration gradient of constituents extending out from the creek.

A review of the data indicate that Dead Creek is not serving as a source of constituents to soils in the surrounding flood plain. The COPCs identified in transect soils in Section 3.0 are likely representative of background conditions in the area, as discussed above. Moreover, no COPCs were identified in soils in Transects 1 and 2, which are the transects located closest to the sites. Therefore, it can also be concluded that the sites are not serving a source of constituents to the residential, commercial and undeveloped soils in the study area.

8.3.2 Exposure Point Concentrations

Exposure points are located where potential receptors may contact COPCs at or from the site. The concentration of COPCs in the environmental medium that receptors may contact must be estimated in order to determine the magnitude of potential exposure. Both measured and modeled EPCs have been used in this risk assessment.

Measured EPCs. The EPC for a human health risk assessment is defined as the 95% upper confidence limit (95% UCL) on the arithmetic mean concentration, or the maximum concentration, whichever is lower (U.S. EPA, 1992a), for the RME scenario and the arithmetic mean concentration for the MLE scenario. Summary statistics have been calculated for each COPC in each medium, as presented in Appendix B. Calculation of the 95% UCL is dependent upon the distribution of the data set. The 95% UCL calculations were conducted as described by USEPA (1992a).

Modeled EPCs. Some pathways required modeling to derive the EPCs. These pathways include volatile constituents in groundwater migrating upwards and infiltrating into indoor air, outdoor air and excavation air, generation of fugitive dusts from undisturbed soils as well as during construction activities, and prediction of garden produce concentrations. The models used are described in Section 5.0 and the appendices.

The exposure point concentrations for each COPC in each medium are presented in Section 5 tables for both the RME and MLE scenarios.

8.3.3 Receptor Evaluation

Table 5-1 presents the detailed receptor/pathway/area matrix that summarizes the receptors evaluated in each area, by medium and exposure route. These scenarios were developed based on the data, the CSM, and the COPCs identified in each medium. RME scenarios and MLE scenarios based on appropriate USEPA guidance were both evaluated in the quantitative risk assessment. In all, 64 receptor scenarios were evaluated in the Sauget Area 1 risk assessment.

To estimate the potential risk to human health that may be posed by the presence of COPCs in environmental media in the study area, it is first necessary to estimate the potential exposure dose of each COPC for each receptor. The exposure dose is estimated for each constituent via each exposure pathway by which the receptor is assumed to be exposed. Exposure dose equations combine the estimates of constituent concentration in the environmental medium of interest with assumptions regarding the type and magnitude of each receptor's potential exposure to provide a numerical estimate of the exposure dose. The exposure dose is defined as the amount of COPC taken into the receptor and is expressed in units of milligrams of COPC per kilogram of body weight per day (mg/kg-day). The exposure doses are combined with the toxicity values to estimate potential risks and hazards for each receptor. The exposure dose and risk calculation spreadsheets are presented in Appendix P.

8.4 Risk Characterization

The potential risk to human health associated with potential exposure to COPCs in environmental media at the site is evaluated in this step of the risk assessment process. Risk characterization is the process in which the dose-response information (Section 4.0) is integrated with quantitative estimates of human exposure derived in the Exposure Assessment (Section 5.0). The result is a quantitative estimate of the likelihood that humans will experience any adverse health effects given the exposure assumptions made. Two general types of health risk are characterized for each potential exposure pathway considered: potential carcinogenic risk and potential noncarcinogenic risk. Carcinogenic risk is evaluated by averaging exposure over a normal human lifetime, which, based on USEPA guidance (1989a), is assumed to be 70 years. Noncarcinogenic risk is evaluated by averaging exposure over the total exposure period.

Characterization of the potential impact of potential carcinogenic and noncarcinogenic constituents is approached in very different ways. The difference in approaches arises from the conservative assumption that substances with possible carcinogenic action proceed by a no-threshold mechanism, whereas other toxic actions may have a threshold, a dose below which few individuals would be expected to respond. Thus, under the no-threshold assumption, it is necessary to calculate a risk, but for constituents with a threshold, it is possible to simply characterize an exposure as above or below the threshold. In risk assessment, that threshold is termed an RfD.

8.4.1 Carcinogenic Risk Characterization

The purpose of carcinogenic risk characterization is to estimate the upper-bound likelihood, over and above the background cancer rate, that a receptor will develop cancer in his or her lifetime as a result of exposure to a constituent in environmental media at the site. This likelihood is a function of the dose of a constituent (described in the Exposure Assessment, Section 5.0) and the CSF (described in the Toxicity Assessment, Section 4.0) for that constituent. The ELCR is the likelihood over and above the background cancer rate, which currently in the U.S. is between 1 in 3 and 1 in 4 (Landis et al., 1998), that an individual will contract cancer in his or her lifetime. The risk value is expressed as a probability (e.g., 10^{-6}, or one in one million). The ELCR is calculated using the following equation:

$$\mathbf{ELCR = LADD\,(mg/kg\text{-}day) \times CSF\,(mg/kg\text{-}day)^{-1}}$$

The potential carcinogenic risk for each exposure pathway is calculated for each receptor. In current regulatory risk assessment, it is assumed that cancer risks are additive or cumulative. Pathway and area-specific risks were summed to estimate the total site potential cancer risk for each receptor. A summary of the total site cancer risks for each receptor group were presented in Section 6.0 and compared to the USEPA's target risk range of 10^{-4} to 10^{-6}. Any COPC that causes an exceedance of 10^{-4} risk level for a particular receptor was designated a COC. Both RME and MLE results were considered in the identification of COC. Remedial goals (RGs) were then calculated for each COC.

The target risk levels used for the identification of COCs are based on USEPA guidance and Illinois TACO guidance. Specifically, USEPA provides the following guidance (USEPA, 1991a):

> "Where the cumulative carcinogenic site risk to an individual based on reasonable maximum exposure for both current and future land use is less than 10^{-4}, and the non-carcinogenic hazard quotient is less than 1, action generally is not warranted unless there are adverse environmental impacts." and,

> "The upper boundary of the risk range is not a discrete line at 1 x 10^{-4}, although EPA generally uses 1 x 10^{-4} in making risk management decisions. A specific risk estimate around 10^{-4} may be considered acceptable if justified based on site-specific conditions."

IEPA provides the following summary for the evaluation of cumulative risk for carcinogens (IEPA, 1998, Fact Sheet 13: Mixture Rule):

> "The cumulative risk of carcinogenic contaminants attacking the same target must not exceed 1 in 10,000 [10^{-4}]. Therefore, the risk from all on-site similar acting carcinogens must be added together. If this cumulative risk level is greater than 1 in 10,000, corrective action must be taken to reach an acceptable risk level."

8.4.2 Non-Carcinogenic Risk Characterization

The potential for exposure to a constituent to result in adverse noncarcinogenic health effects is estimated for each receptor by comparing the Chronic Average Daily Dose (CADD) for each COPC with the RfD for that COPC. The resulting ratio, which is unitless, is known as the Hazard Quotient (HQ) for that constituent. The HQ is calculated using the following equation:

$$HQ = \frac{\textbf{CADD (mg/kg-day)}}{\textbf{RfD (mg/kg-day)}}$$

The target HQ is defined as an HQ of less than or equal to one (USEPA, 1989a). When the HQ is less than or equal to 1, the RfD has not been exceeded, and no adverse noncarcinogenic effects are expected. If the HQ is greater than 1, there may be a potential for adverse noncarcinogenic health effects to occur; however, the magnitude of the HQ cannot be directly equated to a probability or effect level. HQs for a given pathway are summed to provide a hazard Index (HI). Pathway HIs are summed to provide a total receptor HI. When the HI is less than 1, the target has not been exceeded, and no adverse noncarcinogenic effects are expected. This initial HI summation assumes that all the COPCs are additive in their toxicity, and is considered only a screening step as additive toxicity may not be correct. If the HI is greater than 1, further evaluation is necessary to determine if the COPCs are additive in toxicity. This evaluation is termed a toxic endpoint analysis, and is discussed in Appendix R.

8.4.3 Potential Carcinogenic Risk

Potential carcinogenic risks are summarized for all receptors and pathways for the transects in Table 8-1, and for the sites in Table 8-3.

Where RGs are calculated, the following formula is used:

$$RG = \frac{\textbf{EPC x Target (Risk or HQ)}}{\textbf{Calculated (Risk or HQ)}}$$

The target risk level per constituent is 1E-04 minus the total risk for all other constituents for that receptor. The target HQ per constituent is 1 minus the HQ for all other constituents with similar toxic endpoints.

Transects. As shown in Table 8-1, all potential risks calculated for both the RME and MLE receptor scenarios for the transects are within or below the USEPA target risk range of 10^{-4} to 10^{-6}.

Sites. As shown in Table 8-3, all potential risks calculated for both the RME and MLE receptor scenarios in the sites are within or below the USEPA target risk range of 10^{-4} to 10^{-6}, with the exception of the RME outdoor industrial worker receptor in Site I. The calculated risk for this receptor is 1.66E-04, which is only slightly above 10^{-4}. The risk calculated risk for 2,3,7,8-TCDD-TEQ for this receptor is 1.38E-04 due to potential incidental ingestion and dermal contact with soils (see Table 6-3). Therefore, 2,3,7,8-TCDD-TEQ is identified as a COC for Site I soils. The EPC for 2,3,7,8-TCDD-TEQ in Site I is 0.012 mg/kg. The following RG is calculated: the risk associated with all other COPCs in Site I for the outdoor worker receptor is 3E-05; therefore, for a total receptor target risk level of 1E-04, the target risk level for 2,3,7,8-TCDD-TEQ alone is 7E-05; thus the RG for 2,3,7,8-TCDD-TEQ is 0.0062 mg/kg. Of the four soil samples collected in Site I, only one sample exceeds this target concentration; this is WASTE-I-B2-0-0.5FT (see Figure 8-1). Therefore, a remedial action may be warranted at this location, however, it should be noted that the target risk range was not exceeded for the MLE scenario for this receptor.

Dead Creek/Borrow Pit Lake. As shown in Table 8-6, both RME and MLE risks are within or below the target risk range of 10^{-4} to 10^{-6} for the recreational teen and the recreational fisher receptors.

8.4.3.1 Potential Noncarcinogenic Hazard

Transects. As shown in Table 8-2, all potential HIs calculated for both the RME and MLE receptor scenarios for the transects are below the USEPA target HI of 1.

Sites. As shown in Table 8-4, all potential His calculated for both the RME and MLE receptor scenarios for the sites are below the USEPA target HI of 1, with the exception of the following:

- The RME construction worker in Site G;
- The RME construction worker in Site H;
- The MLE construction worker in Site H;
- The RME outdoor industrial worker receptor in Site I; and
- The RME construction worker in Site I.

Because these HIs were calculated by running all HIs for all pathways, a toxic endpoint analysis was conducted for each receptor, as discussed below.

The RME construction worker in Site G. A toxic endpoint analysis was conducted for this receptor, as presented in Appendix R and summarized in Table 8-5. As shown, none of the toxic endpoint specific HIs exceed the target of 1, therefore, no COCs are identified for this receptor in this area.

The RME construction worker in Site H. A toxic endpoint analysis was conducted for this receptor, as presented in Appendix R and summarized in Table 8-5. As shown, all of the toxic endpoint HIs are below 1 with the exception of "nasal effects." This is due to potential inhalation exposures to chloroform and naphthalene (see Table R-3) volatilized from exposed groundwater in an excavation trench (Table 6-6). Therefore, chloroform and naphthalene are identified as COCs for groundwater in Site H.

For the RME construction worker, hazards and risks associated with potential exposure to groundwater were calculated on a per groundwater sampling location basis, prorated based on the number of groundwater sampling locations in the evaluation, and then the hazard/risk per location could be summed for a total hazard/risk for the site. VOCs were detected in two of the three locations in Site H (EE-01 and EE-02). Therefore, these two locations were evaluated in the excavation trench scenario. Chloroform was detected in one of these two; therefore, although the EPC for chloroform in EE-02 is 0.425 mg/L, the effective risk concentration is 0.213 mg/L. [Note that this is a conservative approach, as not all groundwater sampling locations in Site H were used in this averaging.] Similarly, naphthalene was detected in both VOC-containing locations. The concentration in well EE-01 is 2.3 mg/L and the concentration in well EE-02 is 0.195 mg/L; the effective risk concentration is the average of these two, which is 1.25 mg/L. These "effective risk concentrations" were used to calculate the RGs.

For the calculation of RGs, a target HQ of 0.5 for each COC (chloroform and naphthalene) is used here, although any HQ combination that results in a total HI of one would be appropriate for use in developing RGs. The RG for chloroform is 0.0483 mg/L based on a target HI of 0.5, and the RG for naphthalene is 0.624 mg/L based on a target HI of 0.5.

The MLE construction worker in Site H. A toxic endpoint analysis was conducted for this receptor, as presented in Appendix R and summarized in Table 8-5. As shown, none of the toxic endpoint specific HIs exceed the target of 1, therefore, no COCs are identified for this receptor in this area.

The RME outdoor industrial worker receptor in Site I. PCBs are the main contributor to the HI of 2.15 for this scenario. The total HQ for PCBs is 1.99, due to potential ingestion and dermal contact with surface soil. A review of Table R-1, which presents toxic endpoints by constituent, indicates that the toxic endpoints for PCBs are immune, skin and eye effects. None of the other COPCs in Site I exhibit these effects, thus, a quantitative toxic endpoint analysis was not conducted. The EPC for PCBs in Site I soils is 121.3 mg/kg. Assuming an HQ of 1 for this scenario, the RG for PCBs in soil is 61 mg/kg. The only soil sample in Site I that exceeds this target concentration is WASTE-I-B2-0-0.5FT (Figure 8-1), which is the same sample indicating an exceedance based on the potential carcinogenic risk analysis. Therefore, a remedial action may be warranted at this location, however, it should be noted that the target HI was not exceeded for the MLE scenario for this receptor. It is also noted that the highest of the remaining PCB concentrations is an order of magnitude lower at 3.4 mg/kg.

<u>The RME construction worker in Site I.</u> PCBs are the main contributor to the HI of 2.04 for this scenario. The total HQ for PCBs is 1.08, with the majority (1.03) due to potential ingestion and dermal contact with surface soil. As noted above, review of Table R-1, which presents toxic endpoints by constituent, indicates that the toxic endpoints for PCBs are immune, skin and eye effects. None of the other COPCs in Site I exhibit these effects, thus, a toxic endpoint analysis was not conducted. The EPC for PCBs in Site I soils is 121.3 mg/kg. Assuming no action is taken for the low level of PCBs detected in groundwater that contributes an HQ of 0.05 to this scenario, the target HQ for PCBs in soil is 0.95, and the RG for PCBs in soil is 112 mg/kg. The only soil sample in Site I that exceeds this target concentration is WASTE-I-B2-0-0.5FT (Figure 8-1), which is the same sample indicating an exceedance identified above for the outdoor industrial worker, and based on the potential carcinogenic risk analysis. Therefore, a remedial action may be warranted at this location, however, it should be noted that the target HI was not exceeded for the MLE scenario for this receptor. It is also noted that the highest of the remaining PCB concentrations is almost two orders of magnitude lower at 3.4 mg/kg.

<u>Dead Creek/Borrow Pit Lake.</u> As shown in Table 8-7, both RME and MLE risks are below the target HI of 1 for the recreational teen and the recreational fisher receptors.

8.4.3.2 Short-Term Risk Assessment

The short-term risk assessment is presented in Section 7.0. The same screening criteria identified in Section 3.1.1.1 were employed for the short-term COPC (STCOPC) selection. As discussed in the HHRA workplan (Appendix A), the screening criteria were multiplied by 100 and compared to the average site concentration for each constituent detected.

No direct contact STCOPCs for either a residential soil or an industrial soil scenario were identified for either the transects or the sites. No STCOPCs were identified in sediment or surface water. Therefore, these media were not evaluated further in the short-term risk assessment.

In groundwater, of the 34 groundwater sampling locations evaluated in the risk assessment, STCOPCs were identified in only 6 locations from Sites G, H, I, and L. No STCOPCs were identified in the residential (non-potable) wells. Five locations have only one or two STCOPCs identified, and one well (EEG-107, Site G) has 7 STCOPCs identified. There appears to be no clear pattern of STCOPCs between wells. A total of 9 STCOPCs were identified in the 6 groundwater sampling locations combined. Of these, 3 are VOCs.

Concentrations of VOCs in groundwater were used to calculate indoor air, excavation air, and outdoor air concentrations for the above scenarios in Appendices K (indoor air), L (excavation air), and M (outdoor air). These calculated concentrations are compared to 100 times the USEPA Region 9 air PRGs in Table 7-2. As indicated on the table, air concentrations of all constituents are less than 100 times the air PRG with the exception of benzene and chloroform in excavation air. Therefore, concentrations of these constituents are compared to short-term air action levels, as presented in Table 7-3. The short-term action levels were obtained from the ACGIH, NIOSH, and the TNRCC.

The calculated excavation air concentrations of both benzene in Site G and chloroform in Site H are below the TLVs and NIOSH standards (Table 7-3). The concentration of benzene and chloroform exceed the short-term TNRCC ESLs. Although the excavation air concentrations do exceed the TNRCC standards, this does not indicate that a short term risk presently exists. The excavation air scenario is a potential future scenario, in which the air concentrations are modeled rather than measured, and there are no current excavations at the site.

The six non-VOC STCOPCs were evaluated in the chronic risk assessment in a future construction worker scenario. It was assumed that a future construction worker may contact groundwater during excavation for 10 days per year for one year. As indicated on Tables 6-5 and 6-6, none of these six constituents exhibits a potential cancer risk or an HQ that exceeds the target levels. Therefore, neither a chronic nor an acute risk exists for these constituents.

Therefore, it is concluded that concentrations in groundwater are not posing a current short-term risk to receptors at the site. However, future construction activities in Sites G and H should be conducted with air monitoring in the excavation trenches, and the workers using appropriate personal protective equipment.

Arsenic in fish fillet is identified as a STCOPC for the short-term risk assessment. However, as the chronic risk for the fish ingestion pathway does not exceed target risk levels, it is also concluded that a short-term (acute) risk does not exist for exposure to arsenic in fish fillet. Moreover, the form of arsenic present in fish tissue (organic versus inorganic) is likely not to pose acute or chronic health risks (see discussion in Section 7.2.5).

8.5 Summary

Based on the results of this baseline risk assessment and short-term risk assessment for Sauget Area 1, it is recommended that remedial action be considered for 2,3,7,8-TCDD-TEQs and PCBs for a single location in Site I, and that excavation work that is conducted at a depth at which groundwater is

G & H delete

encountered in Sites H and I, based on both long-term and short-term potential health risks, be monitored for air emissions and appropriate personal protective equipment be used during such work. Moreover, the risk assessment was conducted based on the assumption that excavation within the extent of any of the fill areas would be controlled by institutional controls that would require, if such excavation was deemed necessary, that the excavation would be monitored for air emissions and that appropriate personal protective equipment would be used during such work.

TABLE 8-1
SUMMARY OF POTENTIAL RISKS FOR ALL RECEPTORS - TRANSECTS
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Medium (Pathways)	Residential Transects									
	3		4		5		6		7	
	RME	MLE	RME	MLE	RME	MLE	RME	MLE	RME	MLE
Indoor Industrial Worker (IW)										
Groundwater to Indoor Air (inh)	--	--	--	--	--	--	--	--	--	--
Outdoor Industrial Worker (OW)										
Surface Soil (ing/derm)	7.98E-08	7.46E-09	1.15E-06	3.92E-08	--	--	1.11E-06	2.75E-08	1.54E-06	1.21E-07
Surface Soil to Outdoor Air (inh)	2.32E-11	2.13E-12	3.32E-10	1.12E-11	--	--	3.21E-10	7.85E-12	6.64E-09	7.59E-10
Groundwater to Outdoor Air (inh)	--	--	--	--	--	--	--	--	--	--
Total Potential Risk:	**7.98E-08**	**7.47E-09**	**1.15E-06**	**3.92E-08**	**--**	**--**	**1.11E-06**	**2.75E-08**	**1.55E-06**	**1.22E-07**
Construction Worker (CW)										
Surface Soil (ing/derm)	1.77E-09	3.49E-10	3.36E-08	2.76E-09	--	--	2.45E-08	1.29E-09	2.97E-08	4.28E-09
Surface Soil to Outdoor Air (inh)	2.16E-11	3.42E-12	4.11E-10	2.70E-11	--	--	3.00E-10	1.26E-11	6.21E-09	1.22E-09
Groundwater (ing/derm)	--	--	--	--	--	--	--	--	--	--
Groundwater to Outdoor Air (inh)	--	--	--	--	--	--	--	--	--	--
Total Potential Risk:	**1.79E-09**	**3.53E-10**	**3.40E-08**	**2.79E-09**	**--**	**--**	**2.48E-08**	**1.30E-09**	**3.59E-08**	**5.49E-09**
Resident (RES)										
Surface Soil (ing/derm)	1.18E-06	7.96E-08	1.34E-05	3.16E-07	3.52E-06	1.18E-07	1.43E-05	2.74E-07	1.63E-05	7.89E-07
Surface Soil to Outdoor Air (inh)	4.34E-11	1.49E-12	4.92E-10	5.93E-12	1.14E-10	2.13E-12	5.26E-10	5.14E-12	8.16E-09	3.27E-10
Produce (ing)	--	--	--	--	--	--	--	--	5.33E-05	2.87E-06
Total Potential Risk:	**1.18E-06**	**7.96E-08**	**1.34E-05**	**3.16E-07**	**3.52E-06**	**1.18E-07**	**1.43E-05**	**2.74E-07**	**6.96E-05**	**3.65E-06**

Notes:
-- No constituents of potential concern were identified for this pathway.
derm - dermal contact.
ing - ingestion.
inh - inhalation.
MLE - Most Likely Exposure.
NA - Not Applicable. Pathway not identified as a pathway of potential concern.
RME - Reasonable Maximum Exposure.

TABLE 8-2
SUMMARY OF POTENTIAL HAZARD INDICES FOR ALL RECEPTORS - TRANSECTS
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Medium (Pathways)	Residential Transects									
	3		4		5		6		7	
	RME	MLE	RME	MLE	RME	MLE	RME	MLE	RME	MLE
Indoor Industrial Worker (IW)										
Groundwater to Indoor Air (inh)	--	--	--	--	--	--	--	--	--	--
Outdoor Industrial Worker (OW)										
Surface Soil (ing/derm)	NC	NC	NC	NC	--	--	NC	NC	5.59E-03	2.25E-03
Surface Soil to Outdoor Air (inh)	NC	NC	NC	NC	--	--	NC	NC	NC	NC
Groundwater to Outdoor Air (inh)	--	--	--	--	--	--	--	--	--	--
Total Potential Hazard Index:	**NC**	**NC**	**NC**	**NC**	**--**	**--**	**NC**	**NC**	**5.59E-03**	**2.25E-03**
Construction Worker (CW)										
Surface Soil (ing/derm)	NC	NC	NC	NC	--	--	NC	NC	2.39E-03	5.17E-04
Surface Soil to Outdoor Air (inh)	NC	NC	NC	NC	--	--	NC	NC	NC	NC
Groundwater (ing/derm)	--	--	--	--	--	--	--	--	--	--
Groundwater to Outdoor Air (inh)	--	--	--	--	--	--	--	--	--	--
Total Potential Hazard Index:	**NC**	**NC**	**NC**	**NC**	**--**	**--**	**NC**	**NC**	**2.39E-03**	**5.17E-04**
Resident (RES)										
Surface Soil (ing/derm)	NC	NC	NC	NC	1.96E-02	1.04E-03	NC	NC	1.46E-01	3.26E-02
Surface Soil to Outdoor Air (inh)	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Produce (ing)	--	--	--	--	--	--	--	--	5.13E-02	9.12E-03
Total Potential Hazard Index:	**NC**	**NC**	**NC**	**NC**	**1.96E-02**	**1.04E-03**	**NC**	**NC**	**1.97E-01**	**4.17E-02**

Notes:
-- No constituents of potential concern were identified for this pathway.
derm - dermal contact.
ing - ingestion.
inh - inhalation.
MLE - Most Likely Exposure.
NA - Not Applicable. Pathway not identified as a pathway of potential concern.
NC - Not Calculated. No appropriate dose-response values for constituents for this pathway.
RME - Reasonable Maximum Exposure.

TABLE 8-3
SUMMARY OF POTENTIAL RISKS FOR ALL RECEPTORS - SITES
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Medium (Pathways)	Sites									
	G		H		I		L		N	
	RME	MLE	RME	MLE	RME	MLE	RME	MLE	RME	MLE
Indoor Industrial Worker (IW)										
Groundwater to Indoor Air (inh)	**8.22E-07**	**3.09E-08**	**8.89E-07**	**4.70E-08**	**2.08E-06**	**5.95E-08**	**8.76E-08**	**2.95E-09**	**--**	**--**
Outdoor Industrial Worker (OW)										
Surface Soil (ing/derm)	--	--	1.89E-05	1.35E-06	1.65E-04	8.15E-06	5.02E-06	5.07E-07	--	--
Surface Soil to Outdoor Air (inh)	--	--	4.99E-08	3.19E-09	1.15E-07	5.57E-09	1.67E-08	2.56E-09	--	--
Groundwater to Outdoor Air (inh)	5.32E-08	1.05E-09	8.50E-08	2.13E-09	1.25E-06	6.93E-09	2.79E-09	1.50E-10	--	--
Total Potential Risk:	**5.32E-08**	**1.05E-09**	**1.90E-05**	**1.35E-06**	**1.66E-04**	**8.16E-06**	**5.04E-06**	**5.10E-07**	**--**	**--**
Construction Worker (CW)										
Surface Soil (ing/derm)	--	--	4.30E-07	6.57E-08	3.89E-06	4.14E-07	9.97E-08	1.90E-08	--	--
Surface Soil to Outdoor Air (inh)	--	--	3.11E-08	3.41E-09	5.50E-08	4.55E-09	1.56E-08	4.10E-09	--	--
Groundwater (ing/derm)	9.90E-06	4.71E-06	2.71E-06	1.12E-06	4.84E-06	2.39E-06	2.00E-07	1.00E-07	--	--
Groundwater to Outdoor Air (inh)	2.19E-07	6.57E-08	3.35E-07	1.00E-07	1.32E-07	3.16E-08	5.36E-08	1.61E-08	--	--
Total Potential Risk:	**1.01E-05**	**4.78E-06**	**3.51E-06**	**1.29E-06**	**8.92E-06**	**2.84E-06**	**3.69E-07**	**1.39E-07**	**--**	**--**
Trespassing Teenager (TT)										
Surface Soil (ing/derm)	--	--	3.24E-06	3.41E-07	2.81E-05	2.05E-06	8.81E-07	1.33E-07	--	--
Surface Soil to Outdoor Air (inh)	--	--	8.38E-10	1.28E-10	1.94E-09	2.23E-10	2.82E-10	1.02E-10	--	--
Groundwater to Outdoor Air (inh)	8.94E-10	4.20E-11	1.43E-09	8.51E-11	2.10E-08	2.78E-10	4.69E-11	5.99E-12	--	--
Total Potential Risk:	**8.94E-10**	**4.20E-11**	**3.24E-06**	**3.42E-07**	**2.81E-05**	**2.05E-06**	**8.81E-07**	**1.33E-07**	**--**	**--**
Resident (RES)										
Surface Soil (ing/derm)	NA	NA	NA	NA	NA	NA	NA	NA	1.30E-06	9.27E-08
Surface Soil to Outdoor Air (inh)	NA	NA	NA	NA	NA	NA	NA	NA	7.15E-11	2.60E-12
Produce (ing)	NA	NA	NA	NA	NA	NA	NA	NA	--	--
Total Potential Risk:	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**1.30E-06**	**9.27E-08**

Notes:
-- No constituents of potential concern were identified for this pathway.
derm - dermal contact.
ing - Ingestion.
inh - Inhalation.
MLE - Most Likely Exposure.
NA - Not Applicable. Pathway not identified as a pathway of potential concern.
RME - Reasonable Maximum Exposure.

TABLE 8-4
SUMMARY OF POTENTIAL HAZARD INDICES FOR ALL RECEPTORS - SITES
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Sites									
	G		H		I		L		N	
Medium (Pathways)	**RME**	**MLE**	**RME**	**MLE**	**RME**	**MLE**	**RME**	**MLE**	**RME**	**MLE**
Indoor Industrial Worker (IW)										
Groundwater to Indoor Air (inh)	**0.20**	**0.02**	**0.41**	**0.07**	**0.10**	**0.01**	**0.05**	**0.01**	**--**	**--**
Outdoor Industrial Worker (OW)										
Surface Soil (ing/derm)	--	--	0.05	0.01	2.12	0.36	0.03	0.01	--	--
Surface Soil to Outdoor Air (inh)	--	--	NC	NC	NC	NC	NC	NC	--	--
Groundwater to Outdoor Air (inh)	0.01	0.001	0.04	0.003	0.03	0.001	0.002	0.0003	--	--
Total Potential Hazard Index:	**0.01**	**0.001**	**0.09**	**0.01**	**2.15**	**0.36**	**0.03**	**0.01**	**--**	**--**
Construction Worker (CW)										
Surface Soil (ing/derm)	--	--	0.02	0.003	1.08	0.11	0.01	0.003	--	--
Surface Soil to Outdoor Air (inh)	--	--	NC	NC	NC	NC	NC	NC	--	--
Groundwater (ing/derm)	0.09	0.04	0.09	0.04	0.09	0.04	0.10	0.05	--	--
Groundwater to Outdoor Air (inh)	2.40 (a)	0.72	4.43	1.33 (a)	0.87	0.20	0.78	0.23	--	--
Total Potential Hazard Index:	**2.49 (a)**	**0.76**	**4.55**	**1.38 (a)**	**2.04**	**0.34**	**0.89**	**0.29**	**--**	**--**
Trespassing Teenager (TT)										
Surface Soil (ing/derm)	--	--	0.02	0.002	0.84	0.06	0.01	0.002	--	--
Surface Soil to Outdoor Air (inh)	--	--	NC	NC	NC	NC	NC	NC	--	--
Groundwater to Outdoor Air (inh)	0.0004	0.00002	0.002	0.0001	0.001	0.00002	0.00006	0.00001	--	--
Total Potential Hazard Index:	**0.0004**	**0.00002**	**0.02**	**0.002**	**0.84**	**0.06**	**0.01**	**0.002**	**--**	**--**
Resident (RES)										
Surface Soil (ing/derm)	NA	NA	NA	NA	NA	NA	NA	NA	NC	NC
Surface Soil to Outdoor Air (inh)	NA	NA	NA	NA	NA	NA	NA	NA	NC	NC
Produce (ing)	NA	NA	NA	NA	NA	NA	NA	NA	--	--
Total Potential Hazard Index:	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NC**	**NC**

Notes:
-- No constituents of potential concern were identified for this pathway.
derm - dermal contact.
ing - ingestion.
inh - inhalation.
MLE - Most Likely Exposure.
NA - Not Applicable. Pathway not identified as a pathway of potential concern.
NC - Not Calculated. No appropriate dose-response values for constituents for this pathway.
RME - Reasonable Maximum Exposure.
(a) No HI exceedence based on a toxic endpoint analysis (See Table 8-5 and Appendix R).

TABLE 8-5
SUMMARY OF TARGET ENDPOINT ANALYSIS - CONSTRUCTION WORKER
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Medium (Pathways) / Target Endpoint	Sites		
	G	H	
	RME	RME	MLE
Construction Worker (CW)			
Surface Soil (ing/derm)			
Eye	--	0.01	0.002
Immunological	--	0.01	0.002
Skin	--	0.02	0.003
Vascular	--	0.01	0.001
Groundwater (ing/derm)			
Blood	0.03	0.03	0.01
Decreased Body Weight	0.004	0.004	0.002
Decreased Longevity	--	0.0003	0.0001
Developmental	0.0001	0.000002	0.000001
Immunological	0.01	0.001	0.001
Kidney	0.02	0.05	0.02
Liver	0.03	0.06	0.02
Neurological	0.0002	--	--
Reproductive	0.0007	--	--
Skin	--	0.003	0.002
Spleen	0.02	0.002	0.001
Vascular	--	0.003	0.002
Groundwater to Outdoor Air (inh)			
Blood	0.95	0.94	0.28
Developmental	--	0.002	0.001
Kidney	0.42	0.38	0.11
Liver	0.42	0.38	0.11
Nasal	0.99	3.12	0.93
Neurological	0.03	--	--
Total Potential Hazard Index:			
Blood	0.98	0.96	0.29
Decreased Body Weight	0.004	0.004	0.002
Decreased Longevity	--	0.0003	0.0001
Developmental	0.0001	0.002	0.001
Eye	--	0.01	0.002
Immunological	0.01	0.01	0.003
Kidney	0.44	0.43	0.13
Liver	0.45	0.44	0.14
Nasal	*0.99*	**3.12**	*0.93*
Neurological	0.03	--	--
Reproductive	0.0007	--	--
Skin	--	0.03	0.005
Spleen	0.02	0.002	0.001
Vascular	--	0.01	0.003

Notes:
derm - Dermal.
ing - Ingestion.
inh - Inhalation.
MLE - Most Likely Exposure.
RME - Reasonable Maximum Exposure.

TABLE 8-6
SUMMARY OF POTENTIAL RISKS FOR ALL RECEPTORS - DEAD CREEK AND BORROW PIT LAKE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

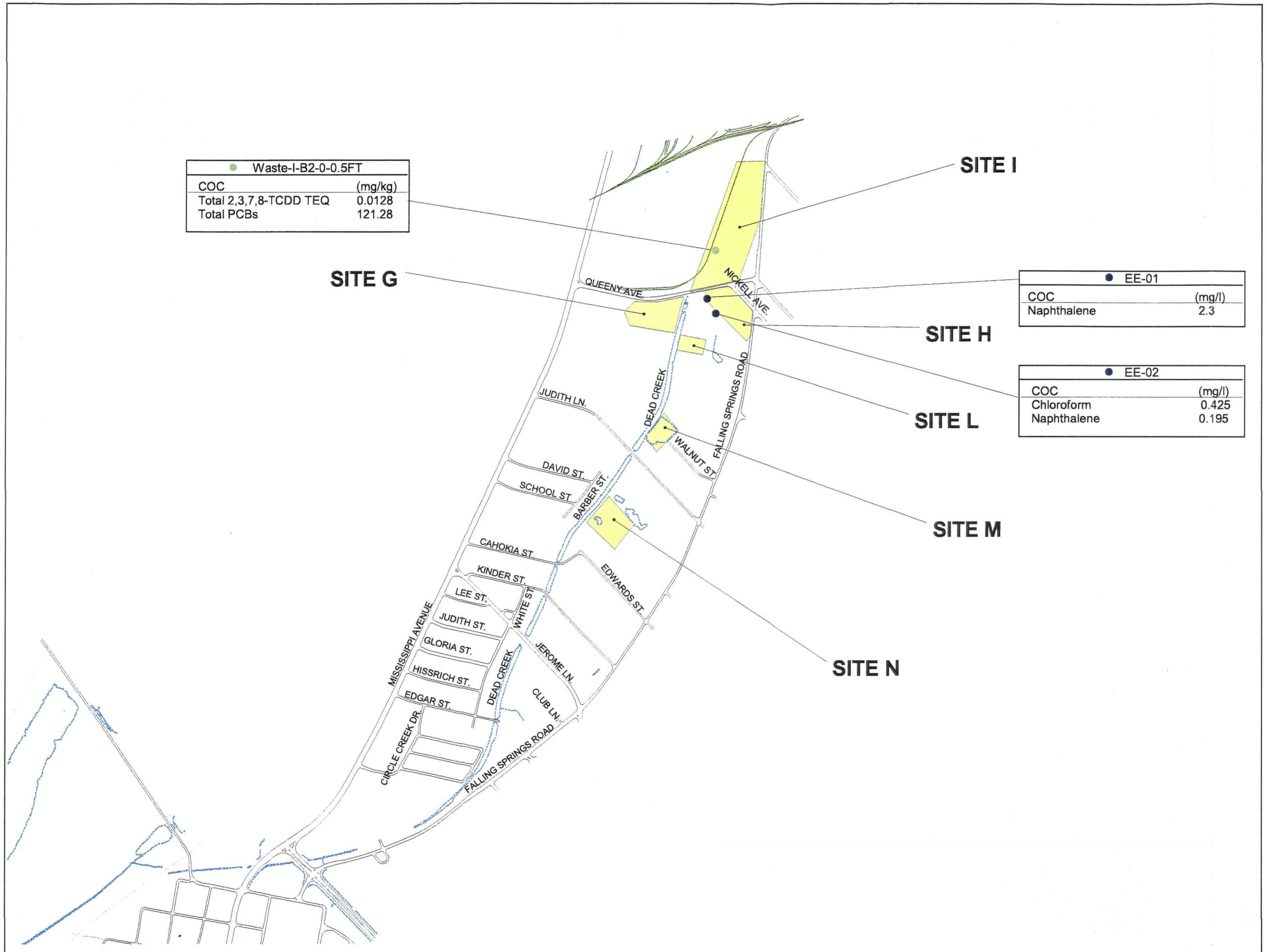
Medium (Pathways)	Dead Creek/Borrow Pit Lake	
	RME	MLE
Recreational Teen (RT)		
Sediment - Wading (ing/derm)	3.02E-07	5.68E-08
Sediment - Swimming (ing/derm)	1.51E-07	2.84E-08
Total Potential Risk:	**4.53E-07**	**8.51E-08**
Recreational Fisher (RF)		
Sediment (ing/derm)	5.83E-07	9.22E-09
Fish Tissue (ing)	3.31E-05	1.24E-06
Total Potential Risk:	**3.36E-05**	**1.25E-06**

Notes:
-- No constituents of potential concern were identified for this pathway.
derm - dermal contact.
ing - ingestion.
inh - inhalation.
MLE - Most Likely Exposure.
NA - Not Applicable. Pathway not identified as a pathway of potential concern.
RME - Reasonable Maximum Exposure.

TABLE 8-7
SUMMARY OF POTENTIAL HAZARD INDICES FOR ALL RECEPTORS - DEAD CREEK AND BORROW PIT LAKE
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Medium (Pathways)	Dead Creek/Borrow Pit Lake	
	RME	**MLE**
Recreational Teen (RT)		
Sediment - Wading (ing/derm)	0.02	0.003
Sediment - Swimming (ing/derm)	0.01	0.001
Total Potential Risk:	**0.03**	**0.004**
Recreational Fisher (RF)		
Sediment (ing/derm)	0.02	0.001
Fish Tissue (ing)	0.17	0.02
Total Potential Risk:	**0.19**	**0.02**

Notes:
-- No constituents of potential concern were identified for this pathway.
derm - dermal contact.
ing - ingestion.
inh - inhalation.
MLE - Most Likely Exposure.
NA - Not Applicable. Pathway not identified as a pathway of potential concern.
RME - Reasonable Maximum Exposure.



N

LEGEND

- Site
- Water Body
- Roads
- Soil Sample Locations
- Groundwater Sample Locations
- CS-A Dead Creek Segment Designations

FIGURE 8-1

Sample By Sample Concentrations of Constituents of Concern (COC)

Sauget Area 1
EE/CA and RI/FS
Volume II
Human Health Risk Assessment

Solutia, Inc.
Remediation Technology Group
St. Louis, Missouri

3000 0 30(

ENSR INTERNATIONAL

J:/Indl_Serv/Project Files/Solutia-6105/Sauget-6105-008/Maps/ensrmaps.apr
December 29, 2000
Revision 0

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APPENDIX A

HHRA WORKPLAN

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HHRA WORKPLAN

This appendix presents a copy of the USEPA-approved Human Health Risk Assessment (HHRA) Workplan for Sauget Area 1, Sauget and Cohokia, Illinois, dated June 25, 1999, including the change pages issued August 6, 1999.

Workplan Appendix C provides the USEPA Region 9 Preliminary Remediation Goals (PRGs). The PRGs current at the time of the submittal of the workplan were dated June 3, 1998. The original appendix has been replaced here with the PRGs current at the time of the conduct of the hazard identification screen for the HHRA, those dated October 1, 1999. [Note that as of this writing, the PRGs have been updated by Region 9, dated November 22, 2000. Of the constituents for which PRGs were used for the screening process, only the value for lead changed significantly. The most current value for lead has been incorporated into the screening process.]

Workplan Appendix D provides the USEPA Region 3 Risk-Based Concentrations (RBCs). The RBCs current at the time of the submittal of the workplan were dated October 1998. The original appendix has been replaced here with the most recent RBCs current at the time of the conduct of the hazard identification screen, those dated October 2000.

Solutia, Inc.
St. Louis, Missouri

Sauget Area 1 EE/CA and RI/FS Support Sampling Plan Volume 1B

Human Health Risk Assessment Workplan, Sauget Area 1, Sauget and Cahokia, Illinois

ENSR Corporation
June 25, 1999
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CONTENTS

CONTENTS (Cont'd)

CONTENTS (Cont'd)

APPENDICES:

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

AAF	Absorption Adjustment Factors
ACGIH	American Conference of Governmental Industrial Hygienists
AOC	Administrative Order by Consent
ASTM	American Society for Testing and Materials
ATSDR	Agency for Toxic Substances and Disease Registry
AWQC	Ambient Water Quality Criteria
bgs	below ground surface
CADD	Chronic Average Daily Dose
CAS	Chemical Abstracts Service
COC	Constituents of Concern
COPC	Constituents of Potential Concern
CS	Creek Segment
CSF	Cancer Slope Factor
CSM	Conceptual Site Model
DQL	Data Quality Levels
EE/CA	Engineering Evaluation and Cost Analysis
EFH	Exposure Factors Handbook
ELCR	Excess Lifetime Cancer Risk
HEAST	Health Effects Assessment Summary Tables
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
IEPA	Illinois Environmental Protection Agency
IRIS	Integrated Risk Information System
LADD	Lifetime Average Daily Dose
MLE	Most Likely Exposure
MRL	Minimum Risk Level
NCEA	National Center for Environmental Assessment
NCP	National Contingency Plan
NIOSH	National Institute of Occupational Safety and Health
NOAA	National Oceanographic and Atmospheric Administration
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyls
PQL	Practical Quantitation Limit
PRG	Preliminary Remediation Goal
QAPP	Quality Assurance Project Plan
RAGS	Risk Assessment Guidance for Superfund
RBC	Risk-Based Concentration

LIST OF ACRONYMS

RfC	Reference Concentration
RfD	Reference Dose
RG	Remedial Goal
RI/FS	Remedial Investigation and Feasibility Study
RME	Reasonable Maximum Exposure
SOW	Scope of Work
SSL	Soil Screening Level
SSP	Support Sampling Plan
SVOC	Semi-Volatile Organic Compounds
TACO	Tiered Approach to Corrective Action Objectives
TCDD	Tetrachlorodibenzo-p-dioxin
TEF	Toxic Equivalence Factor
TEQ	Toxic Equivalence Concentration
TPH	Total Petroleum Hydrocarbons
UCL	Upper Confidence Limit
USEPA	U.S. Environmental Protection Agency
VOC	Volatile Organic Compounds
WHO	World Health Organization

1.0 INTRODUCTION

This document presents a workplan for conducting a streamlined evaluation of short-term exposures, as well as for performing a baseline human health risk assessment (HHRA) for Sauget Area 1 located in Sauget and Cahokia, IL. This workplan has been developed to support the Engineering Evaluation and Cost Analysis (EE/CA) for the Sauget Area 1 source areas and potentially impacted portions of Area 1, and for the Remedial Investigation and Feasibility Study (RI/FS) for Sauget Area 1 groundwater. In addition, this workplan has been developed to satisfy the Scope of Work (SOW) for the EE/CA and RI/FS, provided as an attachment to the Administrative Order by Consent (AOC) entered into by the U.S. Environmental Protection Agency (USEPA) and Solutia Inc. (Solutia), as well as to be compliant with the National Contingency Plan (NCP).

Streamlined Short-Term Risk Assessment

In some situations, short-term exposures (e.g., subchronic daily intakes) may be important. An evaluation of short-term exposures is not normally included as part of the baseline risk assessment. However, since an EE/CA is being performed, an evaluation of the potential for unacceptable health risks after short-term exposures will be conducted. If an identified release is predicted to pose unacceptable health risks after short-term exposure, accelerated response actions to address any potential imminent and substantial endangerment to human health or the environment (i.e., principal threats) may be warranted. According to USEPA (1989a) guidance, the following factors should be considered when deciding whether to evaluate short-term exposures for the purposes of addressing the need for time-critical removal actions:

- The toxicological characteristics of the chemicals of potential concern;
- The occurrence of high chemical concentrations or the potential for a large release;
- Persistence of the chemicals in the environment; and
- The characteristics of the population that influence the duration of exposure.

The above factors will be evaluated and discussed in the EE/CA report. Additionally, if the average concentration of any constituent detected during the investigations exceeds the screening level for that constituent by greater than 100-fold (MADEP, 1995), a short-term exposure scenario evaluation will be performed for that constituent. Since this type of short-term health evaluation is not a standard component of most hazardous waste site health evaluations, limited guidance exists for performing these types of evaluations. Short-term exposures generally pose less of a health risk than longer-term exposures to the same concentration of a chemical. In recognition of this fact, USEPA generally establishes subchronic toxicity criteria at ten fold higher concentrations than chronic toxicity criteria. When available, USEPA-approved acute and subchronic toxicity criteria will be used to evaluate short-term exposures. Both reasonable maximum exposure (RME) and most likely exposure (MLE) scenarios will be included in the evaluation, utilizing upper bound and average media concentrations, respectively.

In the absence of USEPA criteria, short-term air exposures will be evaluated based on guidance provided by USEPA (1993c). As outlined by USEPA (1993c), the primary reference source for obtaining short-term air action levels will be the most recent version of the Texas Air Control Board Effects Screening Level List. Secondary sources of information will include, but will not be limited to, short-term exposure limits derived by the American Conference of Governmental Industrial Hygienists (ACGIH), the National Institute for Occupational Safety and Health (NIOSH), and the Occupational Safety and Health Administration (OSHA).

For soils, acute and intermediate duration minimal risk levels (MRLs) available from ATSDR will be used. If MRLs for soil are not available for a chemical evaluated for potential short-term health effects, acute and/or intermediate exposure duration health criteria will be derived by qualified toxicologists, for review by USEPA Region V and/or IEPA. A condition of imminent endangerment will be considered to exist if target risks exceed 10^{-4} or a hazard index for chemicals with similar target endpoints exceeds 1. Due to the need for time-critical removal actions when an imminent endangerment is identified, USEPA and IEPA will be notified within 30 days if any potential short-term health hazards are identified during the course of the investigations.

Baseline Risk Assessment

The HHRA will follow Task 4, Section 2.5, and Task 5, Section 2 of the SOW. In addition, the HHRA will also comply with USEPA guidance for conducting a risk assessment including, but not limited to, the following:

- Risk Assessment Guidance for Superfund (RAGS): Volume 1 - Human Health Evaluation Manual (Parts A and D) (USEPA, 1989a and 1998a).

- USEPA Soil Screening Guidance: Technical Background Document (USEPA, 1996a).

- Human Health Evaluation Manual Supplemental Guidance; Standard Default Exposure Factors. (USEPA, 1991a).

- Exposure Factors Handbook (USEPA, 1997a).

- Land Use in CERCLA Remedy Selection Process (USEPA, 1995).

The baseline risk assessment will evaluate potential health effects after chronic daily exposures and will be conducted using the four step paradigm as identified by the USEPA (USEPA, 1989a). The steps are:

- Data Evaluation and Hazard Identification
- Toxicity Assessment
- Exposure Assessment
- Risk Characterization

This workplan is organized into the following sections:

- Site Characterization – Section 2.0 of this workplan discusses the site and its environs, and presents a conceptual site model describing source areas, potential migration pathways, and potentially impacted media.

- Hazard Identification – Section 3.0 of this workplan presents a discussion of how site data will be summarized, and a description of the process for the selection of constituents of potential concern (COPC) to be evaluated quantitatively in the risk assessment.

- Dose-Response Assessment – Section 4.0 of this workplan presents a discussion of the dose-response assessment process. The dose-response assessment evaluates the relationship between the magnitude of exposure (dose) and the potential for occurrence of specific health effects (response) for each COPC. Both potential carcinogenic and noncarcinogenic effects will be considered. The most current USEPA verified dose-response values will be used when available.

- Exposure Assessment - Section 5.0 of this workplan presents a discussion of the exposure assessment process. The purpose of the exposure assessment is to provide a quantitative estimate of the magnitude and frequency of potential exposure to COPC by a receptor. Potentially exposed individuals, and the pathways through which those individuals may be exposed to COPC are identified based on the physical characteristics of the site, as well as the current and reasonably foreseeable future uses of the site and surrounding area. The extent of a receptor's exposure is estimated by constructing exposure scenarios that describe the potential pathways of exposure to COPC and the activities and behaviors of individuals that might lead to contact with COPC in the environment.

- Risk Characterization – Section 6.0 of this workplan presents a discussion of the risk characterization process and uncertainties associated with the risk assessment process. Risk characterization combines the results of the exposure assessment and the toxicity assessment to derive site-specific estimates of potentially carcinogenic and noncarcinogenic risks resulting from both current and reasonably foreseeable potential human exposures to COPC. The results of the risk characterization will be used to identify constituents of concern (COC), which are the subset of those COPC whose risks result in an exceedance of the target risk range of 10^{-6} to 10^{-4} for potential carcinogens and a target Hazard Index of 1 for noncarcinogens (that act on the same target organ), as defined in the AOC SOW and by the Illinois Environmental Protection Agency (IEPA) (1998).

Within any of the steps of the risk assessment process described above, assumptions must be made due to a lack of absolute scientific knowledge. Some of the assumptions are supported by considerable scientific evidence, while others have less support. The assumptions that introduce the greatest amount of uncertainty in this risk evaluation will be discussed in Section 6.0 of the HHRA report.

- Summary and Conclusions – Section 7.0 of this workplan will discuss how the results of the HHRA will be summarized in the final report.

Each of these steps is discussed in the sections that follow. References are provided in Section 8.0 of this workplan. The sections of the HHRA report submitted as part of the EE/CA and RI/FS will be organized following this same format.

2.0 SITE CHARACTERIZATION

This workplan addresses the areas of Sauget Area 1 as identified in the AOC. Specifically, the EE/CA for Sauget Area 1 will address the following areas:

- Fill areas (Sites G, H, I, L, M, and N), and
- Potentially impacted areas:
  - Dead Creek Segments (CS): CS-B, CS-C, CS-D, CS-E, and CS-F
  - Commercial, residential and/or undeveloped properties adjacent to these creek segments

The RI/FS for Sauget Area 1 will address groundwater in the following areas:

- Fill areas and areas downgradient of the source areas
- Groundwater in the area of, and private wells identified along, Walnut Street and Judith Lane in Cahokia, IL

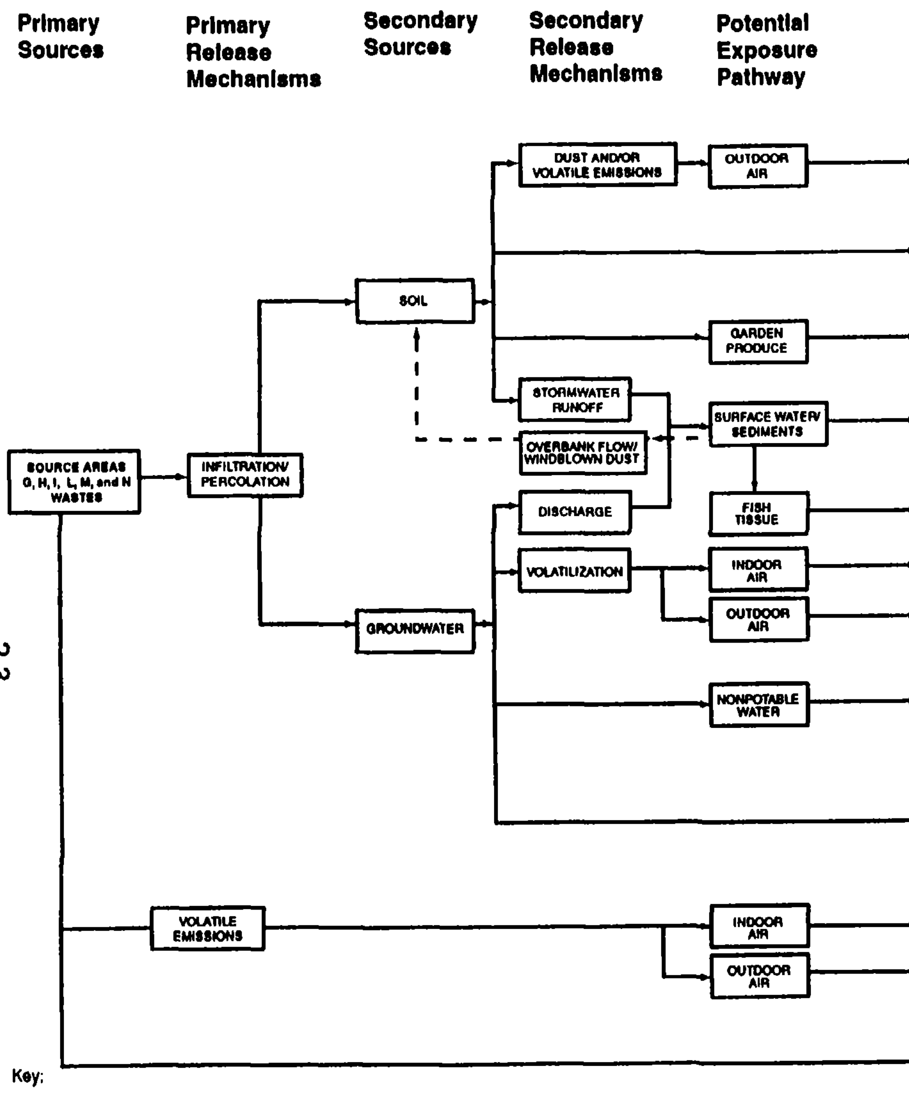
To guide identification of appropriate exposure pathways for evaluation in the risk assessment, a conceptual site model (CSM) for human health has been developed. The purpose of the CSM is to identify fill areas, potential migration pathways of constituents from fill areas to media where exposure can occur, and to identify potential human receptors. Potential exposure pathways and potential receptors are discussed in Section 5.0.

Conceptual Site Model

At Sauget Area 1, the fill areas are identified as Sites G, H, I, L, M, and N. Constituents in the fill areas may leach to underlying groundwater. Volatile organic compounds (VOCs) in groundwater may volatilize into outdoor air and may infiltrate into air in overlying buildings. Constituents in groundwater may discharge to Dead Creek and subsequently be transported downstream to the lower reaches of Dead Creek and into the Borrow Pit Lake. Fish in the Borrow Pit Lake may have accumulated constituents present in surface water and/or sediments. In addition, it is possible that Dead Creek flooding events and/or windblown dust may have resulted in the distribution of constituents to soils on the properties adjacent to the creek. Figure 2-1 presents a CSM for Sauget Area 1. The CSM identifies sources, environmental release mechanisms, potential exposure pathways, potential exposure routes, and potential human receptors. Those potentially complete exposure pathways to be considered for further evaluation in the risk assessment are identified. Receptors and pathways are discussed in more detail in Section 5.0.

The Support Sampling Plan (SSP) sampling program has been developed to address these potential migration pathways. Sampling to be conducted in support of the HHRA include the following. Fill area surface soil and wastes will be sampled and characterized. Groundwater in the source areas, downgradient of the source areas, and southwest of the source areas will be sampled and characterized. Shallow groundwater and domestic wells in the vicinity of Walnut Street and Judith Lane will also be characterized. Surface and subsurface soils in the undeveloped and residential areas of the residential/commercial/undeveloped properties adjacent to Dead Creek will be sampled. Surface water and sediments in Dead Creek and the Borrow Pit Lake will be sampled. In addition, fish tissue samples from the Borrow Pit Lake will be analyzed.

The CSM is meant to be a "living" model that can be updated and modified as additional data become available. The exposure scenarios proposed for quantitative evaluation in the risk assessment (see Section 5.0) have been identified based on this current CSM. However, the CSM will be reviewed and modified as necessary once the analytical data from the SSP program have become available. Any substantial changes in the CSM and, subsequently, the pathways for quantitative evaluation, will be discussed with USEPA prior to conduct of the risk assessment.



Potential Receptors

POTENTIAL EXPOSURE ROUTE	INDOOR INDUSTRIAL WORKER (a)	OUTDOOR INDUSTRIAL WORKER (a)	CONSTRUCTION/ UTILITY WORKER (a), (b)	RESIDENT (b), (e)	RECREATIONAL TEENAGER (c), (d)	TRESPASSING TEENAGER (a)	RECREATIONAL FISHER (d)
INHALATION	○	●	●	●	○	●	○
INCIDENTAL INGESTION	○	●	●	●	○	●	○
DERMAL CONTACT	○	●	●	●	○	●	○
INGESTION	○		○	●	○		○
INCIDENTAL INGESTION	○		○	○	●		●
DERMAL CONTACT	○		○	○	●		●
INGESTION	○		○	○	○		●
INHALATION	●		○	●	○		○
INHALATION	○	●	●	●	○	●	○
INCIDENTAL INGESTION	○		○	●	○		○
DERMAL CONTACT	○		○	●	○		○
INCIDENTAL INGESTION	○		●	○	○		○
DERMAL CONTACT	○		●	○	○		○
INHALATION	●			● (e)			
INHALATION		●	●	● (e)		●	
INCIDENTAL INGESTION			●				
DERMAL CONTACT			●				

Key:

● Pathway potentially complete, further evaluation recommended

○ Pathway evaluated and found incomplete or insignificant, no further evaluation recommended

(a) Source areas
(b) Residential, commerical, undeveloped areas
(c) Dead Creek segments CS-B through CS-E
(d) Borrow Pit Lake: SC-F
(e) Since Area N will be evaluated for potential residential receptors

FIGURE 2-1
Conceptual Site Model for Human Health Risk Assessment
Sauget Area 1 EE/CA and RI/FS, Sauget and Cahokia, Illinois
Solutia, Inc.

M990207

3.0 HAZARD IDENTIFICATION

The purpose of the hazard identification process is two-fold: 1) to evaluate the nature and extent of release of constituents present at the site; and 2) to select a subset of constituents of potential concern (COPC) for quantitative evaluation in the risk assessment. This step of the risk assessment will involve compiling and summarizing SSP data for the risk assessment, and selecting COPC based on a series of screening criteria.

3.1 Data Compilation

For Sauget Area 1, existing data are available from previously conducted investigations. New data will be available from the field activities specified in the SSP. The HHRA will include a section that compiles all of the valid data collected from the site in support of the SSP.

3.1.1 Areas and Media

The SSP for Sauget Area 1 is designed to investigate the source areas, Dead Creek and its environs, and the residential/commercial/undeveloped areas adjacent to Dead Creek. Of the data to be collected for the SSP, analytical data for use in the HHRA will be available for the following media:

- Source area shallow groundwater;
- Source area downgradient alluvial groundwater;
- Shallow groundwater southwest of source areas;
- Shallow groundwater in the vicinity of Walnut Street and Judith Lane;
- Groundwater from private wells in the vicinity of Walnut Street and Judith Lane;
- Source area surface soil;
- Source area subsurface waste;
- Residential area surface soil (0-0.5 feet below ground surface (bgs));
- Residential area subsurface soil (0.5-6 feet bgs);
- Dead Creek sediment;
- Borrow Pit Lake sediment;
- Dead Creek surface water;
- Borrow Pit Lake surface water;
- Fish tissue from Borrow Pit Lake (if populations are present); and
- 24-hour air samples at Sites G, H, I, and L.

Analytical data for use in the HHRA from background or reference locations will be available for the following media:

- Surface soil;

- Subsurface soil;
- Groundwater;
- Surface water;
- Sediment;
- Fish tissue; and
- Upwind air.

3.1.2 Analytes

The SSP identifies the suites of analytes for each medium. For ease of discussion here, the analytes to be included in the risk evaluation are identified as follows:

- Full suite of analytes – VOCs, semi-volatile organic compounds (SVOCs), metals, mercury, cyanide, polychlorinated biphenyls (PCBs), pesticides, and herbicides;
- Dioxins – dioxins and furans; and
- Industry-specific analytes – PCBs, total petroleum hydrocarbons (TPH), copper, zinc, fluorides, phosphorous and ortho-phosphate. [Note - only PCBs, copper, zinc, fluorides, and phosphorous will be quantitatively evaluated in the HHRA. Fluorides, phosphorous, and ortho-phosphate will be analyzed for only in surface water.]

All analytical data collected in support of the SSP will be compiled and tabulated in a database for statistical analysis. Summary statistics tables will be developed for each medium in each area, and will present for each constituent the minimum and maximum detected values, the arithmetic mean, the 95th percentile upper confidence limit (UCL) on the arithmetic mean (USEPA, 1992a), and the frequency of detection. Constituents analyzed for but never detected in a particular medium will not be included in the summary statistics for that medium. For constituents detected at least once in a particular medium, samples reported as "non-detect" by the laboratory will be assigned a value of one-half the sample quantitation limit in calculating summary statistics (USEPA, 1989a; IEPA, 1998). Duplicate sample results will be averaged and treated as a single sample result when compiling summary statistics.

3.1.3 Sample Collection by Area and Medium

Data sets for each medium are described below. Sample collection strategy based on human health risk assessment needs is discussed in conjunction with the potential exposure scenarios in Section 5.2.

3.1.3.1 Groundwater

Fill Areas - Data for shallow groundwater samples from wells located in the fill areas, the downgradient alluvial aquifers, and shallow groundwater southwest of the fill areas, as identified in the SSP, will be evaluated in the risk assessment. These data will include the full suite of analytes and dioxins.

Residential Area - Analytical data for shallow groundwater in the Walnut Street/Judith Lane residential area, as well as for four domestic wells in this area will be evaluated in the risk assessment. These data will include the full suite of analytes and dioxins.

3.1.3.2 Fill Area Wastes

Sediment samples will be collected from Site M and analyzed for the full suite of analytes and dioxins. Subsurface waste samples will be collected from Sites G, H, I, L, and N and analyzed for the full suite of analytes and dioxins. These data will be used in the risk assessment. As described in Section 5.2, the VOC sample will be a discrete sample taken along the depth of the waste at the location having the highest PID/FID (Photo/flame Ionization Detector) reading. The remaining analyses will be conducted on a sample composited from material collected throughout the depth of the waste (note - non-waste materials will not be included in this composite). Composting is being conducted to ensure that the sample collected is representative of all the wastes, not just a single stratum within the wastes. Composite samples are not generally regarded as the best descriptor with which to calculate the upper bound concentrations for a data set (USEPA, 1989a). In this case, because the sample is collected from waste materials only, the detected analytes are more likely to be representative of the heterogeneity of the wastes than those from a single sample collected at a discrete location within the wastes.

3.1.3.3 Soil

Fill area - Surface soil (0-0.5 feet bgs) samples will be collected, colocated with the fill area waste sampling locations. These samples will be analyzed for the full suite of analytes and dioxins. These data will be used in the risk assessment.

Residential/Commercial/Undeveloped Area - Surface (0-0.5 feet bgs) and subsurface (0.5-6 feet bgs) soil samples will be collected from undeveloped areas along seven transects as identified in the SSP in the residential/commercial/undeveloped area adjacent to Dead Creek and analyzed for the full suite of analytes and dioxins. Based on the transect analytical results, surface and subsurface soil samples will be collected from three residences along each of Transects 1 through 6 and two residences along Transect 7 and analyzed for the full suite of analytes and dioxins. These data will be used in the risk assessment.

3.1.3.4 Surface Water

Surface water samples will be collected from Dead Creek and Borrow Pit Lake, and analyzed for the full suite of analytes and dioxins. These data will be used in the risk assessment. Dead Creek and Borrow Pit Lake will be evaluated separately in the risk assessment. Depending on the distribution of analytical results, the sections of Dead Creek may be evaluated separately or in combination in the risk assessment.

3.1.3.5 Sediment

Sediment samples will be collected from Dead Creek and Borrow Pit Lake. Data for the full suite of analytes and dioxins will be available for approximately 20 percent of these samples, and data for the industry-specific analytes will be available for approximately 80 percent of these samples. Depending on the distribution of analytical results, the sections of Dead Creek may be evaluated separately or in combination in the risk assessment.

3.1.3.6 Fish Tissue

Fish tissue samples will be collected from Borrow Pit Lake and analyzed for the full suite of analytes (with the exception of VOCs) and dioxins. The determination of the applicability of the fish ingestion pathway for this waterbody is discussed in the Exposure Assessment (Section 5.3.5). If the fish ingestion pathway is included for quantitative evaluation in the HHRA, whole fish data will be used. Sample compositing will occur only where necessary to achieve a sufficient sample size for analysis. Predator, bottom feeding and forage fish will be collected as available. Expected types to be encountered include bass, crappie, catfish and/or bluegill.

3.1.3.7 Air

Air samples will be collected in the vicinity of Sites G, H, I, and L and analyzed for VOCs, SVOCs, PCBs, dioxin, and metals. Because these are 24-hour air samples collected at a single time point, they will not be used in the calculation of risks in the HHRA. However, the data will be compared to chronic and, if appropriate, to subchronic or acute criteria as discussed in Section 1.0. Initial comparison will be made to USEPA Region 9 Preliminary Remediation Goals for air (USEPA, 1998c).

3.2 Selection of Constituents of Potential Concern

COPCs are a subset of the complete list of constituents detected in site media that are carried through the quantitative risk assessment process. Selection of COPCs focuses the analysis on the most likely risk "drivers." As stated in USEPA guidance (USEPA, 1993a):

"Most risk assessments are dominated by a few compounds and a few routes of exposure. Inclusion of all detected compounds at a site in the risk assessment has minimal influence on the total risk. Moreover, quantitative risk calculations using data from environmental media that may contain compounds present at concentrations too low to adversely affect public health have no effect on the overall risk estimate for the site. The use of a toxicity screen allows the risk assessment to focus on the compounds and media that may make significant contributions to overall risk."

Several factors are typically considered in selecting COPCs for a site, including natural background, frequency of detection, and toxicity, including essential nutrient status. Risk calculations will be conducted using the COPCs identified in this step.

Constituents of concern (COC) will be identified in Section 6.0 of the HHRA as those constituents whose risks result in an exceedance of the target risk range of 10^{-6} to 10^{-4} for potential carcinogens and a target Hazard Index of 1 for noncarcinogens (that act on the same target organ), as defined in the AOC SOW and by IEPA (1998). Remedial goals will be developed for COCs based on the exposure pathways evaluated in the risk assessment.

The steps to be used to identify COPC are presented below.

3.2.1 Evaluation of Frequency of Detection and Essential Nutrient Status

A frequency of detection screen will be conducted on each medium (e.g., sediment, surface soil, etc.). Constituents that are detected in fewer than 5% of samples, provided 20 samples are available, will not be included as COPCs. However, some of these constituents may be retained as COPC based on professional judgment, considering factors such as the presence of a hotspot. In addition to the frequency of detection screen, essential nutrients (i.e., calcium, iron, magnesium, sodium and potassium) will not be included as COPCs (USEPA, 1989a).

3.2.2 Comparison to Background

Background samples to be collected in the vicinity of the site present information on naturally-occurring levels of constituents typical for the local area. The purpose of comparing site conditions to local background is to determine if site concentrations of constituents are representative of background concentrations, which, therefore, should not be included in risk calculations. Background comparisons will be conducted for each medium using site-specific background data and background concentrations for rural and urban areas of Illinois published by IEPA (1998).

Groundwater, surface water and sediment samples collected in upgradient locations, if available, will provide site-specific background data for these media. Soil samples collected at appropriate off-site locations, as described in the SSP, will provide site-specific background data for the soil media. See SSP Sections 6.8, 7.6, and 11.4 for a discussion of background locations.

The procedure for determining whether a constituent concentration is consistent with background will follow that developed by USEPA Region 4 (USEPA, 1996b). Maximum detected concentrations of constituents in environmental media at the site will be compared against two times the arithmetic mean site-specific background concentration. USEPA Region 4 states that although RAGS (USEPA, 1989a) allows the use of statistics in data evaluation, statistics may not be sufficiently conservative at this stage of the risk evaluation; and in most cases, there are not a sufficient number of samples for conducting a statistical analysis. Therefore, if maximum concentrations of inorganic constituents in an area are found to be less than two times the average background concentrations, then those constituents can be eliminated from quantitative evaluation in the risk assessment. Constituents whose concentrations are found to be above typical local background levels will be retained for evaluation in the next step of the hazard identification process (Toxicity Screen).

3.2.3 Toxicity Screen

A toxicity screen will be performed in accordance with USEPA Region 5 guidance (USEPA, 1998b) and IEPA regulations (IEPA, 1998). USEPA Region 5 guidance identifies the following three sources as appropriate screening levels for soil, in order of preference:

1) Most recent generic soil screening levels (SSLs) developed and presented in Appendix A of the Soil Screening Guidance (USEPA, 1996a). The SSLs are based on ingestion and inhalation (direct contact) and soil-to-groundwater exposure pathways for a residential scenario.

2) Site-specific SSLs derived using the methodology outlined in the above reference.

3) Most recent USEPA Region 9 Preliminary Remediation Goals (PRGs; USEPA, 1998c).

The IEPA Tiered Approach to Corrective Action (TACO) (IEPA, 1998) is very similar to that outlined in the SSL guidance (USEPA, 1996a) in that it provides Tier I criteria based on direct contact (ingestion and inhalation) and the soil-to-groundwater pathway. In fact, the TACO Tier I criteria have been developed based on the USEPA SSL guidance. However, the TACO Tier I criteria are more comprehensive because values are provided for a longer list of constituents, and Tier I criteria are available for both residential and industrial scenarios.

Therefore, IEPA TACO Tier I criteria will be used for the identification of COPC for soil and groundwater for quantitative evaluation in the risk assessment. Where IEPA TACO Tier I criteria (IEPA, 1998) are not available, USEPA Region 9 PRGs (1998c) will be used. Residential values will be used to identify COPC for residential soils and sediments and all groundwater, and industrial values will be used to evaluate source area soils and waste.

Following IEPA guidance, the criteria for groundwater will be adjusted for cumulative effects for both potential carcinogens and noncarcinogens. Per the TACO program guidance, Tier I criteria for soils are not adjusted for cumulative effects (IEPA, 1998).

IEPA TACO Tier I values are not available for surface water, fish tissue, or air. Hence, surface water data will be compared with the lower of screening values identified for groundwater and the promulgated human health Ambient Water Quality Criteria (AWQCs) for fish ingestion (USEPA, 1998d). Fish tissue data will be compared to the USEPA Region 3 Risk-Based Concentrations (RBCs) for fish (USEPA, 1998e). Modeled air concentrations will be compared to USEPA Region 9 PRGs (USEPA, 1998c).

These criteria were used to develop data quality levels (DQLs) to be used to identify appropriate practical quantitation limits (PQLs) for laboratory methods for the analytical program. The DQLs and PQLs are discussed in greater detail in the Quality Assurance Project Plans (QAPPs) for the site (see Volumes 2B and 3B of the SSP). The DQLs for the HHRA are presented in Appendix A.

Per USEPA request, the current TACO Tier I values are presented in Appendix B, the current USEPA Region 9 PRGs are presented in Appendix C, the current USEPA Region 3 RBCs are presented in Appendix D, and the current AWQCs are presented in Appendix E. The PRGs and RBCs are periodically updated by USEPA. The most current criteria available will be used in the selection of COPC.

Constituents with maximum concentrations less than or equal to the screening criteria will not be included as COPC. If no COPC are identified for a medium, that medium will not be evaluated quantitatively in the HHRA.

Tables presenting the results of each screening step will be presented in the risk assessment report. The final list of COPC for inclusion in the risk assessment will also be presented in the risk assessment and included in all subsequent risk calculations.

4.0 DOSE-RESPONSE ASSESSMENT

The purpose of the dose-response assessment is to identify the types of adverse health effects a constituent may potentially cause, and to define the relationship between the dose of a constituent and the likelihood or magnitude of an adverse effect (response).

Adverse effects are defined by USEPA as potentially carcinogenic or noncarcinogenic (i.e., potential effects other than cancer). Dose-response relationships are defined by USEPA. The dose-response values for potentially carcinogenic effects are termed Cancer Slope Factors (CSFs) or Unit Risk Factors, and dose-response values for noncarcinogenic effects are termed Reference Doses (RfDs) or Reference Concentrations (RfCs). These values are available from USEPA sources, such as USEPA's Integrated Risk Information System (IRIS), an on-line computer database (USEPA, 1999), and the Health Effects Assessment Summary Tables (HEAST) (USEPA, 1997b). Both sets of potential health effects will be evaluated in the risk assessment. The USEPA National Center for Environmental Assessment (NCEA) will be consulted if a constituent does not have a dose-response value in either IRIS or HEAST. Appropriate criteria may also be derived by qualified toxicologists using current USEPA-approved methodologies.

Dose-response values used in the risk assessment will be presented in tabular format. For each constituent the table will present the Chemical Abstracts Service (CAS) number, dose-response value, source, study animal, study method, and where appropriate, target organ, critical effect, uncertainty factors, and confidence level.

Dose-response values are available for inhalation and oral exposures. Oral dose-response values will be used to evaluate dermal exposures, provided appropriate dermal absorption values are available. COPC will be evaluated quantitatively for the dermal exposure pathway. For inhalation pathways, reference concentrations (in units of mg/m^3) will be converted to reference doses (in units of mg/kg-day) for calculating risk for systemic toxicants. For direct acting toxicants, the oral, dermal, and inhalation pathways will be evaluated separately.

4.1 PCB Dose-Response

Risks from potential exposures to PCBs will be calculated using the most current guidance available from USEPA. Currently, USEPA-approved guidance is provided in IRIS (USEPA, 1999). Total PCB concentrations will be calculated by summing the separate homolog concentrations. The total PCB concentrations will be multiplied by the verified cancer slope factors listed in IRIS (USEPA, 1999). Guidance provided in IRIS specifies three tiers of human slope factors for environmental PCBs: high risk and persistence, low risk and persistence, and lowest risk and persistence. The choice of slope factors for use depends on the medium of exposure and PCB chlorine content, as outlined in IRIS

(USEPA, 1999). Thus, a slightly differing approach to calculating potential cancer risks will be taken for different media.

Non-cancer risks from potential exposures to PCBs will be calculated using the most conservative RfD for a PCB mixture. In addition, uncertainty surrounding the use of USEPA-verified toxicity criteria will be discussed.

4.2 Dioxin Dose-Response

The potential carcinogenic effects associated with exposure to dioxin and furan congeners in environmental media will be assessed in accordance with the approach developed by USEPA (1989b). Risks will be calculated for 2,3,7,8-TCDD and the dioxin and furan congeners using the cancer slope factor for 2,3,7,8-TCDD listed in HEAST and using the TEFs provided in USEPA (1989b). The TEFs are fractions that equate the potential toxicity of each congener to that of 2,3,7,8-TCDD. The World Health Organization (WHO) (Van den Berg et al., 1998) has assigned a TEF to each of the dioxin and furan congeners that slightly differ from the USEPA-approved values. The TEFs provided by USEPA (1989b) and proposed by Van den Berg et al. (1998) are listed in Table 4-1. The exposure point concentration for each dioxin and furan congener will be multiplied by its TEF, resulting in a TCDD toxic equivalence concentration (TCDD-TEQ). The TCDD-TEQ values for each of the congeners will then be added together. The cancer slope factor for 2,3,7,8-TCDD will then be used to calculate potential carcinogenic risks resulting from potential exposure to 2,3,7,8-TCDD, and the dioxin and furan congeners.

TABLE 4-1
TEFs FOR DIOXIN AND FURAN CONGENERS
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

CONSTITUENT	CAS NO.	TEF (a)	TEF (b)
Dioxins			
2,3,7,8-TetraCDD	1746-01-6	1	1
1,2,3,7,8-PentaCDD	40321-76-4	0.5	1
1,2,3,4,7,8-HexaCDD	39227-28-6	0.1	0.1
1,2,3,6,7,8-HexaCDD	57653-85-7	0.1	0.1
1,2,3,7,8,9-HexaCDD	19408-74-3	0.1	0.1
1,2,3,4,6,7,8-HeptaCDD	35822-39-4	0.01	0.01
OctaCDD	3268-87-9	0.001	0.0001
2,3,7,8-PentaCDDs	NA	0.5	NA
2,3,7,8-HexaCDDs	NA	0.1	NA
2,3,7,8-HeptaCDDs	NA	0.01	NA
Furans			
2,3,7,8-TetraCDF	51207-31-9	0.1	0.1
1,2,3,7,8-PentaCDF	57117-41-6	0.05	0.05
2,3,4,7,8-PentaCDF	57117-31-4	0.5	0.5
1,2,3,4,7,8-HexaCDF	70648-26-9	0.1	0.1
1,2,3,6,7,8-HexaCDF	57117-44-9	0.1	0.1
1,2,3,7,8,9-HexaCDF	72918-21-9	0.1	0.1
2,3,4,6,7,8-HexaCDF	60851-34-5	0.1	0.1
1,2,3,4,6,7,8-HeptaCDF	67562-39-4	0.01	0.01
1,2,3,4,7,8,9-HeptaCDF	55673-89-7	0.01	0.01
OctaCDF	39001-02-0	0.001	0.0001
2,3,7,8-HexaCDFs	NA	0.1	NA
2,3,7,8-HeptaCDFs	NA	0.01	NA

Notes:
CAS - Chemical Abstracts Service.
CDD- Chorodibenzodioxin
CDF - Chlorodibenzofuran.
TEF - Toxicity Equivalency Factor.
(a) USEPA, 1989b. Interim Procedures for Estimating Risks Associated with Mixtures of Chlorinated Dibenzo-p-dioxins and Chlorinated Dibenzofurans (CDDs and CDFs) and 1989 Update.
(b) - "Toxic Equivalency Factors for PCBs, PCDDs, PCDFs for Humans and Wildlife." Van den Berg, et al. 1998.

5.0 EXPOSURE ASSESSMENT

The purpose of the exposure assessment is to predict the magnitude and frequency of potential human exposure to each of the COPC retained for quantitative evaluation in the HHRA. The first step in the exposure assessment process is the characterization of the setting of the site and surrounding area. Current and potential future site uses and potential receptors (i.e., people who may contact the impacted environmental media of interest) are then identified. Potential exposure scenarios appropriate to current and potential future site uses and receptors are then developed. Those potential exposure pathways for which COPC are identified and are judged to be complete will be evaluated quantitatively in the risk assessment. Reasonable maximum exposure (RME) assumptions, and most likely exposure (MLE) assumptions based on appropriate USEPA guidance, will be employed in the quantitative risk assessment.

5.1 Identification of Potential Exposure Scenarios

Exposure scenarios are developed on the basis of the CSM for a site. The CSM for Sauget Area 1 was presented in Section 2.0 (Figure 2-1). The CSM was used to develop the potential exposure scenarios identified below and in Table 5-1. Table 5-1 provides a more detailed presentation of receptors and pathways by exposure area to be evaluated in the risk assessment.

Sauget Area 1 fill areas have been used for industrial purposes for many years (since the 1930s or earlier) and use of these areas is expected to remain industrial. The fill areas within Sauget Area 1 are zoned commercial/industrial and it is likely that the fill areas will continue to be used well into the reasonably foreseeable future for commercial/industrial purposes.

As discussed in Sections 1.0 and 2.0 of the SSP, Sites G, H, I, L, M and N contain wastes that came from a wide variety of municipal and industrial sources. Site M is a fenced former sand borrow pit that is now filled with water and is hydrologically connected to Dead Creek. Site G is a fill area stabilized by USEPA in an emergency response that solidified organic wastes, placed a temporary soil cover over the site, and controlled site access by the installation of a fence. Recent inspection indicates that the site and fence are still stable. Recent inspection of Site H indicated that the site is stable with a vegetative cover and no exposed wastes at the surface. Site L also appears to be stable. It is covered with cinders and is located in a vegetated field. Site N reportedly contains construction rubble. Site I was originally used as a sand and gravel pit that received industrial and municipal wastes. The site is currently graded and covered with crushed stone and used for equipment and truck parking.

Because these source areas are generally covered and stable with no evidence of exposed wastes at the surface, sampling in these areas is focused on collection of waste samples. Although wastes are not present at the surface, surface soil sampling will also be conducted.

An on-site outdoor industrial worker and a trespassing teen will be evaluated for potential exposure to COPC where identified in surface soil, and to COPC that may volatilize into outdoor air from underlying groundwater and wastes.

Because the wastes are at depth, a construction/utility worker will be evaluated for potential exposure to constituents in the waste. Construction/utility work is assumed to occur only up to depths of 12 to 15 feet bgs, however, to be conservative, analytical data from waste samples composited throughout the depth of the fill material will be used in the risk assessment (see discussion in Section 3.1.3.2). Due to the shallow depth of groundwater, the construction/utility worker may contact groundwater during excavation.

Due to the presence of a plume of VOCs in groundwater in the source areas and wastes present in the subsurface, an on-site indoor industrial worker will be evaluated for potential exposure to COPC via inhalation of volatile constituents present in indoor air due to vapor intrusion from groundwater and/or wastes. Analytical data collected from shallow groundwater from the existing wells at the sites and analytical data from subsurface waste samples will be used in the risk assessment. If VOCs are detected in shallow groundwater in other groundwater areas of the site, an indoor industrial worker receptor will be evaluated.

Dead Creek bisects Sauget Area 1, passing through areas of commercial land use, areas of open land, and areas of residential land use, and eventually discharges to Borrow Pit Lake and Prairie DuPont Creek. As such, Dead Creek serves as a potential migration pathway for COPC from the impacted fill areas. It is possible that windblown dust or periods of overbank flow (i.e., flooding) have resulted in the deposition of site-related COPC on soil of the adjacent residential/commercial/undeveloped areas. Therefore, it is possible that residents in the vicinity of Dead Creek may be exposed to site-related COPC in soil. Recent inspection indicates that some residences have vegetable gardens. Site-related COPC may be taken up by plant material and subsequently ingested. If VOCs are present in shallow groundwater and/or subsurface soils in these areas, they may infiltrate into indoor air and outdoor air. If these are complete exposure pathways, they will be evaluated in the HHRA.

In addition, a construction/utility worker may contact COPC in surface and subsurface soil and shallow groundwater in the residential/commercial/undeveloped area. The major potential COPC migration pathway is overbank flow. Due to this migration pathway, COPC are expected to occur at the surface. If COPC are located at depth in this area, it would be due to infiltration from the surface. Such infiltration is not expected to move COPC to great depths; thus, the purpose for collecting subsurface soils in the 0.5-6 foot interval. Although construction and utility work may proceed to depths of 12 to 15 bgs, COPC concentrations in the 0.5 to 6 foot interval are expected to be higher than for deeper intervals. Therefore, these data will be used to evaluate potential exposure to COPC in subsurface soil, which will provide a conservative estimate of risk for this pathway.

An indoor industrial or commercial worker in the residential/commercial/undeveloped area may be exposed to COPC in indoor air via inhalation due to volatilization of COPC from underlying soil and/or groundwater in this area. Similarly, an outdoor industrial or commercial worker may be exposed to COPC in surface soil via incidental ingestion, dermal contact and inhalation of volatiles and particulates. Inhalation of COPC volatilizing from groundwater and/or subsurface soil may also occur.

As access to Dead Creek is generally uncontrolled, it is possible that recreational receptors (i.e., trespassing children/teenagers) could be exposed to COPC in surface water and sediment of Dead Creek and Site M while wading. Although access to Borrow Pit Lake is uncontrolled, it is located on private property, and access is very difficult due to its setting. However, recreational teenagers could be exposed to COPC in surface water and sediment of Borrow Pit Lake while wading or swimming. Again, although access is difficult, recreational fishing may occur in Borrow Pit Lake.

Groundwater is not used as a source of drinking water in the area. However, there are some private wells in the area that may be used for outdoor household activities. Therefore, residents may be exposed to COPC in groundwater in these areas via incidental ingestion and dermal contact. If it is determined that groundwater is being used as a sole source of drinking water for any of the residences downgradient of the fill areas, a drinking water scenario will be added to the HHRA.

Final receptor selection will be made once site analytical data have been evaluated and COPCs identified. If no COPCs are identified in a particular medium (e.g., fish), and/or the potential exposure pathway, upon further investigation, is judged to be incomplete (e.g., recreational fishing), then the exposure scenarios associated with that medium/pathway will not be quantitatively evaluated in the HHRA. The potential receptors and their associated exposure scenarios are discussed below and summarized in Table 5-1.

5.2 Sample Collection Strategy

Table 5-2 presents a summary of the sampling strategy for each environmental medium and identifies the number of samples to be collected. In addition, the exposure areas, receptor(s) and potential exposure route(s) to be evaluated using the data are identified, based on the CSM developed for the site (see Figure 2-1, and Table 5-1). Sample collection in residential areas has been focused on areas adjacent to Dead Creek upstream of Route 3, as these areas are closer to the fill areas than those downstream of Route 3.

5.3 Receptor Identification

The following subsections discuss the parameters that will be used to evaluate each of the potential receptors in the HHRA. Both RME and MLE scenarios will be evaluated for each receptor. Exposure factors common to several of the receptors are discussed in Section 5.4.

5.3.1 Indoor Industrial Worker

Exposure assumptions for the indoor industrial worker under the RME and MLE scenarios are shown in Table 5-3. Given the relatively shallow depth of groundwater, it is possible an indoor industrial worker may be exposed indirectly to groundwater via inhalation of volatile COPC migrating from groundwater and the subsurface to indoor air of an industrial/commercial building. The indoor industrial worker receptor will be evaluated for the fill areas and the residential/commercial/undeveloped areas of Sauget Area 1.

5.3.2 Outdoor Industrial Worker

Exposure assumptions for the outdoor industrial worker under the RME and MLE scenarios are shown in Table 5-4. The outdoor industrial worker may contact COPC in surface soil via incidental ingestion and dermal contact, and may inhale COPC via volatilization from the surface and subsurface and via particulate emissions from the surface.

5.3.3 Trespassing Teenager

Exposure assumptions for the trespassing teenager under the RME and MLE scenarios are shown in Table 5-5. It is assumed that this receptor can be exposed to COPC in surface soil in the fill areas via accidental ingestion, dermal contact, and inhalation of volatiles and particulates, and can be exposed to COPC in subsurface wastes and/or groundwater via inhalation of volatiles.

5.3.4 Construction/Utility Worker

Exposure assumptions for the construction/utility worker under the RME and MLE scenarios are shown in Table 5-6. Exposure media of interest in the evaluation of potential risk to a future construction/utility worker will potentially include surface soil, subsurface soil/wastes and groundwater. Exposure could occur via incidental ingestion of and dermal contact with soil/waste and shallow groundwater and via inhalation of fugitive dust and/or vapors from soil and groundwater. A construction/utility worker receptor will be evaluated for the fill areas and the residential/commercial/undeveloped areas of Sauget Area 1. The soil ingestion rate listed in Table 5-6 for the construction worker under the MLE scenario is discussed in Section 5.4.

5.3.5 Resident

Given the potential for migration of site-related COPC from the fill areas to a residential area, it is possible that a resident may be exposed to COPC in environmental media. The exposure media of interest are surface soil, subsurface soil, plant tissue, and groundwater. A resident may potentially be exposed directly to COPC in soil via incidental ingestion, dermal contact, and inhalation of volatiles and particulates. Indirect exposure to COPC in soil may occur and through ingestion of produce grown in impacted residential soil. Public water is provided to residential areas; however, some private wells exist. Residents could be exposed to COPC in groundwater in these areas via incidental ingestion and dermal contact during outdoor household use. In addition, if VOCs are present in groundwater and/or subsurface soil in this area, residents could be exposed via inhalation of vapors migrating to indoor air. Table 5-7 presents the exposure assumptions for evaluation of a child resident (0 to 6 yrs of age) and an adult resident under RME and MLE scenarios. Because several of the Dead Creek segments are adjacent to the residential areas under evaluation, the recreational teenager (below) and residential receptor risks will be evaluated both separately and in total, as indicated in Table 5-1. In addition, a future residential exposure scenario will be evaluated for areas M and N. Because area M is a lagoon, the future exposure pathway to be evaluated will be inhalation of sediment–derived dusts by residential receptors in transects 1 and 2, assuming the lagoon could be drained and dried in the future.

5.3.6 Recreational Teenager

It is assumed that an adolescent could access Dead Creek and Borrow Pit Lake surface water and sediment for recreational purposes. Therefore, it is possible that a receptor (aged 7 to 18 years) (referred to here as a recreational teenager for ease of discussion) could be exposed to COPC present in surface water and sediment of Dead Creek and Borrow Pit Lake while wading or swimming, respectively. Exposure assumptions for the recreational teenager under the RME and MLE scenarios are shown in Table 5-8.

5.3.7 Recreational Fisher

Recreational fishing may take place at Borrow Pit Lake. As Dead Creek may serve as a potential migration pathway for COPC from the source areas, fish in Borrow Pit Lake may contain COPC in their tissue. Therefore, a recreational fisher has the potential to be exposed to site-related COPC through ingestion of fish from Borrow Pit Lake. This receptor may also contact COPC in surface water and sediment while fishing. The exposure assumptions for the recreational fish ingestion pathway for the RME and MLE receptors are summarized in Table 5-9. To determine if this pathway is complete, two field surveys will be conducted. An ecological evaluation of the Borrow Pit Lake will be used to determine if it can sustain a recreational fishery. In addition, a creel survey will be conducted to determine if Borrow Pit Lake is fished and what fish may be caught.

5.4 Exposure Parameters

5.4.1 Soil Ingestion Rate – Adult Construction Worker

Incidental soil ingestion occurs at all ages as a result of hand-to-mouth activities. Currently, there are little or no reliable quantitative data available for estimating adult soil ingestion rates. USEPA risk assessment guidance suggests a soil ingestion rate of 100 mg/day for adults in a residential scenario (USEPA, 1989a, 1991a), and a soil ingestion rate of 50 mg/day for adults in an industrial scenario (USEPA, 1991a).

USEPA presented an estimate of a soil ingestion rate for adults doing yard work of 480 mg/day in their supporting evidence for the commercial/industrial soil ingestion rate of 50 mg/day in the "Standard Default Exposure Factors" Directive (USEPA, 1991a); the 480 mg/day value was not presented in the table of default exposure factors. The Agency states: "For certain outdoor activities in the commercial/industrial setting (e.g., construction or landscaping), a soil ingestion rate of 480 mg/day may be used; however, this type of work is usually short-term and is often dictated by the weather. Thus, exposure frequency would generally be less than one year and exposure duration would vary according to site-specific construction/maintenance plans." However, some regions and state agencies have stipulated the use of this value to evaluate a construction worker exposure scenario. The Hawley (1985) study, which is the basis for the soil ingestion rate of 480 mg/day, was recently reviewed by the USEPA (USEPA, 1997a), which stated that, "Given the lack of supporting measurements, these estimates must be considered conjectural."

In the Hawley (1985) study, the author assumed that soil adheres to the surface area of the hands at a loading of 3.5 mg/cm^2. This value was based on a layer of soil on skin assumed to be 0.005 cm deep, a soil density of 1.5 g/cm^2, and 50% void space. Using the author's derived soil-to-skin adherence loading of 3.5 mg/cm^2 and assuming that the amount of soil covering a fraction of the hands (approximately 70 cm^2) is ingested twice a day, Hawley calculated a soil ingestion rate of 480 mg/day.

Hawley's 1985 analysis was one of the first published health risk assessments and was performed before any of the quantitative fecal tracer soil ingestion studies for either children or adults were conducted (Calabrese et al., 1989; Davis et al., 1990; Clausing et al., 1987; Calabrese et al., 1990). Thus, the estimate of 480 mg/day predates all of our current knowledge about soil ingestion among both children and adults, as well as recent published data on soil-to-skin adherence rates.

In 1993, USEPA sponsored a workshop to evaluate soil-to-skin adherence data. As a result, a study to determine a more accurate characterization of soil-to-skin adherence was sponsored by the USEPA and conducted by John C. Kissel and associates at the University of Washington (Kissel et al., 1996; Holmes et al., 1998). The intent of this study was to resolve uncertainties and develop more accurate measures of soil-to-skin loading rates for individuals involved in various occupational and recreational activities. As reported in the Exposure Factors Handbook (EFH) (USEPA ,1997a), soil loading on skin surfaces as a result of various occupational and recreational activities was directly measured. This study indicates that soil loadings vary with the type of activity and the body parts contacted. As one would expect, adherence appears to be greatest during outdoor activities such as farming and gardening, and more soil/dust tends to adhere to the hands and knees than to other areas of the body.

Average hand soil loading factors are as presented in the EFH (USEPA, 1997a) for the adult outdoor workers evaluated by Kissel and Holmes. In every case, soil adherence during occupational exposure was measured to be considerably lower than Hawley's estimate of 3.5 mg/cm^2. The range of soil adherence loadings measured by Kissel and Holmes falls within the USEPA range of 0.2 to 1.0 mg/cm^2 (USEPA, 1992b).

For this evaluation, the construction worker receptor is assumed to be exposed to COPC in surface and subsurface soils during excavation activity. Based on this exposure scenario, the "farmer" receptor provided in the EFH is considered to provide an upper-bound estimate of soil adherence. A soil ingestion rate can be calculated by substituting the soil adherence value for the receptor for the estimated value derived by Hawley (1985), as follows:

$$\frac{480\ mg/day}{3.5\ mg/cm^2} = \frac{ingestion\ rate\ (mg/day)}{soil\ adherence\ (mg/cm^2)}$$

The soil adherence value for the "farmer" is 0.47 mg/cm^2. The calculated soil ingestion value is 64 mg/day; therefore, a soil ingestion rate of 64 mg/day is used for the MLE construction worker receptor in this risk evaluation.

Additional support for this value comes from a new paper by Kissel and coworkers (Kissel et al., 1998) that presents the results of a study of the transfer of soil from hand to mouth by intentional licking. Soil was loaded onto the skin by pressing the hand onto soil, and the amount transferred to the mouth was measured. The thumb sucking, finger mouthing, and palm licking activities resulted in geometric mean soil mass transfers of 7.4 to 16 mg per event. The author concludes that "transfer of 10 mg or more of soil from a hand to the oral cavity in one event is possible, but requires moderate soil loading and more than incidental hand-to-mouth contact." However, "the fraction of soil transferred from hand to mouth that is subsequently swallowed is unknown but may be less than 100 percent." In addition, "the adult volunteers in this study reported that the presence of roughly 10 mg of soil in the mouth is readily detected (and unpleasant). Repeated unintentional ingestion of that mass of soil by adults therefore seems unlikely. In light of this observation, the 480 mg per day estimate [of Hawley, 1985] would require hundreds or perhaps thousands of hand-to-mouth contacts that resulted in soil transfer per day."

The 64 mg/day soil ingestion rate for the industrial and construction worker receptors recommended here is supported by this study, as 5 hand to mouth events during the course of a workday is more reasonable to assume than 48 or more.

For the RME scenario, a soil ingestion rate of 100 mg/day is assumed for the construction worker. This is the adult soil ingestion rate provided by USEPA (1991).

5.4.2 Frequency of Exposure to COPC in Soil

A meteorological factor is generally used to account for the fraction of the year during which exposure to constituents in soils may occur (Sheehan et al., 1991; USEPA, 1989a). It is reasonable to assume that direct contact with soil or intrusive activities will not occur for residential receptors during inclement weather, i.e., when it is raining or snowing, when the ground is wet or frozen, or when snow or ice (32 degrees F) are covering the ground. Thus the frequency of contact with potentially impacted soil is adjusted for these site-specific meteorological conditions (USEPA, 1989a).

There are only a few metrics that can be used to describe the fraction of the year when meteorological conditions are likely to limit exposure. These include temperature and the amount of precipitation per day and per year, which includes rain, snow and ice. While measures are collected hourly, the National Weather Service reports the number of days when precipitation is greater than 0.01 inches (one one-hundredth), greater than 0.1 inches (one tenth), and greater than 1 inch in their annual summary data. The number of days with precipitation greater than 0.1 inches is selected as the best representation of when exposure is likely to be limited by snow, rain, or ice. The National Oceanographic and Atmospheric Administration (NOAA) provides daily temperature data. It is assumed that exposure to soils is limited by temperatures less than 32 degrees F. Therefore, limiting the assumption of exposure to soils to those days with less than 0.1 inch of precipitation and temperatures above 32 degrees F is reasonable.

Based on ten years of meteorological data (1986-1995) provided by NOAA (1996), a meteorological factor is derived for use in the exposure equations. On the average, 66 days/year in this area receive 0.1 or greater inches of precipitation, and there are typically 27 days/year with a mean temperature of 32 degrees F or below. Accounting for days when both events occur (assumed to be 10% of the rain days or 6 days/year), the number of inclement days, 87, can be calculated (27 + 66 – 6 = 87). It is assumed that these days are evenly spaced throughout the course of the year. The meteorological factor is then calculated (87/365 = 24%). Thus it is assumed that exposure to soils will not occur for the "receptor" 24% of the assumed days of exposure (exposure frequency) due to weather restrictions.

The choice of a precipitation target of 0.1 inches is in keeping with guidance provided in the Compilation of Air Pollution Emission Factors, which assumes that soil suspension will not occur on days with more than 0.01 inches of precipitation (USEPA, 1995b). It is probable, however, that this metric both over- and under-estimates the potential exposure in some conditions. For, example, it is possible that some exposure to soils may occur on days when it rains just over 0.1 inches in the early morning and then the ground dries during the course of the day. Alternatively, significant rainfall, such as greater than 1 inch, is likely to saturate the soil for consecutive days, and several inches of snow (which may fall all on one day with one storm) may cover the ground and inhibit direct contact for several days. With both of these considerations in mind, it is likely that a meteorological factor based on inclement days defined as precipitation greater than 0.1 inches and average temperatures less than 32 degrees F is reasonable.

5.5 Quantification of Potential Exposures

To estimate the potential risk to human health that may be posed by the presence of COPC at the site, it is first necessary to estimate the potential exposure dose of each COPC. The exposure dose is estimated for each constituent via each exposure pathway by which the receptor is assumed to be exposed. Exposure dose equations combine the estimates of constituent concentration in the environmental medium of interest with assumptions regarding the type and magnitude of each receptor's potential exposure to provide a numerical estimate of the exposure dose. The exposure dose is defined as the amount of COPC taken into the receptor and is expressed in units of milligrams of COPC per kilogram of body weight per day (mg/kg-day).

Exposure doses are defined differently for potential carcinogenic and noncarcinogenic effects. The Chronic Average Daily Dose (CADD) is used to estimate a receptor's potential intake from exposure to a COPC with noncarcinogenic effects. According to USEPA (1989a), the CADD should be calculated by averaging the dose over the period of time for which the receptor is assumed to be exposed. Therefore, the averaging period is the same as the exposure duration. For COPC with potential carcinogenic effects, however, the Lifetime Average Daily Dose (LADD) is employed to estimate potential exposures. In accordance with USEPA (1989a) guidance, the LADD is calculated by averaging exposure over the receptor's assumed lifetime (70 years). Therefore, the averaging period is the same as the receptor's assumed lifetime. The standardized equations for estimating a receptor's average daily dose (both lifetime and chronic) are presented below, followed by descriptions of receptor-specific exposure parameters and constituent-specific parameters.

5.5.1 Estimating Potential Exposure from Ingestion of and Dermal Contact with Soil or Sediment

Both incidental ingestion of, and dermal contact with, soil and/or sediment are assumed to occur for many of the receptors. The following equations are used to calculate the estimated exposure.

Average Daily Dose (Lifetime and Chronic) Following Incidental Ingestion of Soil or Sediment (mg/kg-day):

$$ADD = \frac{CS \times IR \times EF \times ED \times AAF_0 \times CF}{BW x AT}$$

where:

ADD	=	Average Daily Dose (mg/kg-day)
CS	=	Soil concentration (mg/kg soil)
IR	=	Ingestion rate (mg soil/day)
EF	=	Exposure frequency (days)
ED	=	Exposure duration (year)
AAF_0	=	Oral-Soil Absorption Adjustment Factor (AAF) (unitless)
CF	=	Unit conversion factor (kg soil/10^6 mg soil)
BW	=	Body weight (kg)
AT	=	Averaging time (days)

Average Daily Dose (Lifetime and Chronic) Following Dermal Contact with Soil or Sediment (mg/kg-day):

$$ADD = \frac{CS \times SA \times AF \times EF \times ED \times AAF_d \times CF}{BW \times AT}$$

where:

ADD	=	Average Daily Dose (mg/kg-day)
CS	=	Soil concentration (mg/kg soil)
SA	=	Exposed skin surface area (cm^2/day)
AF	=	Soil to skin adherence factor (mg soil/cm^2)
EF	=	Exposure frequency (days)
ED	=	Exposure duration (year)
AAF_d	=	Dermal-Soil AAF (unitless)
CF	=	Unit conversion factor (kg soil/10^6 mg soil)
BW	=	Body weight (kg)
AT	=	Averaging time (days)

5.5.2 Estimating Potential Exposure via Inhalation

Exposure to COPC migrating from soil to air is assumed to occur for many of the potential receptors. The equation used to estimate exposure to COPC via inhalation is as follows:

Average Daily Dose (Lifetime and Chronic) Following Inhalation of COPC (mg/kg-day):

$$ADD = \frac{CA \times IR \times AAF_i \times ET \times EF \times ED}{BW \times AT}$$

where:

ADD	=	Average Daily Dose (mg/kg-day)
CA	=	Air concentration (mg/m^3)
IR	=	Inhalation rate (m^3 /hr)
AAF_i	=	Inhalation AAF (unitless)
ET	=	Exposure time (hours/day)
EF	=	Exposure frequency (days)
ED	=	Exposure duration (year)
BW	=	Body weight (kg)
AT	=	Averaging time (days)

5.5.3 Estimating Potential Exposure from Groundwater/Surface Water

A potential construction worker may contact COPC in groundwater during soil excavation. The risk assessment assumes that the recreational teenager will come in contact with surface waters of Dead Creek and Borrow Pit Lake. In addition, residents could contact groundwater via outdoor use of private well water. The equation used to estimate a receptor's potential exposure via incidental ingestion of groundwater/surface water is:

Average Daily Dose (Lifetime and Chronic) Following Ingestion of Water (mg/kg-day):

$$ADD = \frac{CW \times IR \times EF \times ED \times AAF_o \times CF}{BW x AT}$$

where:

ADD	=	Average Daily Dose (mg/kg-day)
CW	=	Water concentration (mg/L)
IR	=	Water ingestion rate (L/day)
EF	=	Exposure frequency (days)
ED	=	Exposure duration (year)
AAF_o	=	Oral-water AAF (unitless)
BW	=	Body weight (kg)
AT	=	Averaging time (days)

The equation used to estimate a receptor's potential exposure via dermal contact with groundwater/surface water is as follows:

Average Daily Dose (Lifetime and Chronic) Following Dermal Contact with Water (mg/kg-day):

$$ADD = \frac{CW \times SA \times PC \times ET \times EF \times ED \times AAF_d \times CF}{BW x AT}$$

where:

ADD	=	Average Daily Dose (mg/kg-day)
CW	=	Water concentration (mg/L)
SA	=	Exposed skin surface area (cm^2/day)
PC	=	Dermal permeability constant (cm/hr)
ET	=	Exposure time (hours/day)
EF	=	Days exposed per year (day/365 day)
ED	=	Years exposed (year)

AAF_d	=	Dermal-water AAF (unitless)
CF	=	Unit conversion factor ($L/10^3 cm^3$)
BW	=	Body weight (kg)
AT	=	Averaging time (year)

5.5.4 Estimating Potential Exposure From Food Consumption

A recreational fisher may be exposed to COPC through ingestion of fish obtained from Borrow Pit Lake. A residential receptor may be exposed to COPC in garden produce. The equation used to estimate a receptor's potential exposure via food consumption is:

Average Daily Dose (Lifetime and Chronic) Following Food Consumption (mg/kg-day):

$$ADD = \frac{CF \times IR \times AAF \times EF \times ED}{AT \times BW}$$

where:

ADD	=	Average Daily Dose (mg/kg-day)
CF	=	Concentration in food (mg/kg)
IR	=	Ingestion rate (kg/day)
AAF	=	Oral-diet AAF (unitless)
EF	=	Exposure frequency (days)
ED	=	Exposure duration (days)
AT	=	Averaging time (days)
BW	=	Body weight (kg)

5.6 Calculation of Exposure Point Concentrations

Exposure points are located where potential receptors may contact COPCs at or from the site. The concentration of COPCs in the environmental medium that receptors may contact must be estimated in order to determine the magnitude of potential exposure.

Measured data will be available for surface soil, subsurface waste, subsurface soil, groundwater, surface water, sediment, and fish tissue. Groundwater will be evaluated on a plume or well-by-well basis as appropriate. The exposure point concentration is defined as the lower of the maximum or 95th percentile UCL arithmetic mean concentrations (USEPA, 1992a) for the RME scenario and the arithmetic mean concentration for the MLE scenario.

Other pathways will require modeling to derive exposure point concentrations. These pathways include volatile chemicals in groundwater and the subsurface migrating upwards and infiltrating into indoor air, and generation of fugitive dust and volatiles from undisturbed soils as well as during *construction activities.*

The model to be used to predict indoor air concentrations of VOCs will be the model of Johnson and Ettinger recommended by the USEPA (1996a and 1997c) to predict concentrations of COPC migrating from groundwater or soil to indoor air of an overlying building. Concentrations of volatile COPC in outdoor air due to migration from subsurface soil and/or groundwater will be estimated using the methodology recommended by the American Society for Testing and Materials (ASTM, 1995).

The calculation of concentrations of inorganic and semivolatile organic COPC bound to soil in fugitive dust involves multiplying the soil exposure point concentrations by the concentration of dust in air as follows:

1) Ambient Air:

   COPC concentration in ambient air (mg/m^3) = Exposure point concentration in soil (mg/kg soil) x Dust concentration (kg soil/m^3)

   The dust concentration in air to be used in the evaluation of ambient outdoor air pathways in this risk evaluation is the inverse of the particulate emission factor derived in accordance with USEPA guidance (USEPA, 1996a).

2) Excavation Air (i.e., during construction activities):

   COPC concentration in excavation air (mg/m^3) = Exposure point concentration in soil (mg/kg soil) x Dust concentration (mg soil/m^3) x Unit correction factor (1 kg/10^6 mg)

   The dust concentration in air to be used in the evaluation of excavation air pathways in this risk evaluation is 60 mg/m^3. This value is the recommended concentration of respirable particulate with a mean diameter of 10 microns or less (PM10) for excavation activities (MADEP, 1995).

COPC concentrations in homegrown produce are dependent upon the potential for direct uptake of COPC from soil through plant roots and will be estimated via the following equation:

COPC Concentration in Produce (mg COPC/kg plant tissue) = Concentration of COPC in soil (mg COPC/kg Soil) x Root Uptake Factor (unitless)

The root uptake factor accounts for uptake from soil to the homegrown produce. As appropriate, chemical-specific root uptake factors will be identified from sources such as Baes et al. (1984) for use in the risk assessment.

TABLE 5-1
RECEPTOR-AREA MATRIX
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

Receptor Medium Secondary Medium (Pathways)	Exposure Areas Fill Area/Sites G	H	I	L	M (lagoon)	N	Creek Segments Ref. Area	CS-B	CS-C	CS-D	CS-E	CS-F	Residential/Commercial/Undeveloped Transects 1	2	3	4	5	6	7	Total Receptors
Indoor Industrial Worker (IW) Fill Area: Subsurface Waste *Indoor Air (inh)* Transects: Subsurface Soi *Indoor Air (inh)* Groundwater *Indoor Air (inh)*	IW-RME-G IW-MLE-G	IW-RME-H IW-MLE-H	IW-RME-I IW-MLE-I	IW-RME-L IW-MLE-L		IW-RME-N IW-MLE-N							IW-RME-C/R-1 IW-MLE-C/R-1	IW-RME-C/R-2 IW-MLE-C/R-2	IW-RME-C/R-3 IW-MLE-C/R-3	IW-RME-C/R-4 IW-MLE-C/R-4	IW-RME-C/R-5 IW-MLE-C/R-5	IW-RME-C/R-6 IW-MLE-C/R-6	IW-RME-C/R-7 IW-MLE-C/R-7	12 12
Outdoor Industrial Worker (OW) Surface Soil (ing/derm) *Outdoor Air (inh)* Fill Area: Subsurface Waste *Outdoor Air (inh)* Transects: Subsurface Soi *Outdoor Air (inh)* Groundwater *Outdoor Air (inh)*	OW-RME-G OW-MLE-G	OW-RME-H OW-MLE-H	OW-RME-I OW-MLE-I	OW-RME-L OW-MLE-L		OW-RME-N OW-MLE-N							OW-RME-C/R-1 OW-MLE-C/R-1	OW-RME-C/R-2 OW-MLE-C/R-2	OW-RME-C/R-3 OW-MLE-C/R-3	OW-RME-C/R-4 OW-MLE-C/R-4	OW-RME-C/R-5 OW-MLE-C/R-5	OW-RME-C/R-6 OW-MLE-C/R-6	OW-RME-C/R-7 OW-MLE-C/R-7	12 12
Construction Worker (CW) Surface Soil (ing/derm) *Outdoor Air (inh)* Fill Area: Subsurface Waste (ing/derm) *Outdoor Air (inh)* Transects: Subsurface Soil (ing/derm) *Outdoor Air (inh)* Groundwater (ing/derm) *Outdoor Air (inh)*	CW-RME-G CW-MLE-G	CW-RME-H CW-MLE-H	CW-RME-I CW-MLE-I	CW-RME-L CW-MLE-L		CW-RME-N CW-MLE-N							CW-RME-C/R-1 CW-MLE-C/R-1	CW-RME-C/R-2 CW-MLE-C/R-2	CW-RME-C/R-3 CW-MLE-C/R-3	CW-RME-C/R-4 CW-MLE-C/R-4	CW-RME-C/R-5 CW-MLE-C/R-5	CW-RME-C/R-6 CW-MLE-C/R-6	CW-RME-C/R-7 CW-MLE-C/R-7	12 12
Trespassing Teenager (TT) Surface Soil (ing/derm) *Outdoor Air (inh)* Subsurface Waste *Outdoor Air (inh)* Groundwater *Outdoor Air (inh)*	TT-RME-G TT-MLE-G	TT-RME-H TT-MLE-H	TT-RME-I TT-MLE-I	TT-RME-L TT-MLE-L		TT-RME-N TT-MLE-N														5 5
Recreational Teen (RT) Sediment (ing/derm) Surface Water (ing/derm)					* RT-RME-M RT-MLE-M		RT-RME-REF RT-MLE-REF	* RT-RME-CS-B RT-MLE-CS-B	** RT-RME-CS-C RT-MLE-CS-C	** RT-RME-CS-D RT-MLE-CS-D	*** RT-RME-CS-E RT-MLE-CS-E	RT-RME-CS-F RT-MLE-CS-F								7 7
Recreational Fisher (RF) Sediment (ing/derm) Surface Water (ing/derm) Fish Tissue (ing)							RF-RME-REF RF-MLE-REF					RF-RME-F RF-MLE-F								2 2
Resident (RES) Surface Soil (ing/derm) *Outdoor Air (inh)* Subsurface Soil (or Waste in Site N) *Indoor/Outdoor Air (inh)* Groundwater (ing/derm) *Indoor/Outdoor Air (inh)* Produce (ing)					RES-RME-M RES-MLE-M (a)	RES-RME-N RES-MLE-N							* RES-RME-C/R-1 RES-MLE-C/R-1	* RES-RME-C/R-2 RES-MLE-C/R-2	** RES-RME-C/R-3 RES-MLE-C/R-3	** RES-RME-C/R-4 RES-MLE-C/R-4	** RES-RME-C/R-5 RES-MLE-C/R-5	*** RES-RME-C/R-6 RES-MLE-C/R-6	*** RES-RME-C/R-7 RES-MLE-C/R-7	9 9 ****
Total Receptors	8	8	8	8	4	10	4	2	2	2	2	4	4	4	4	4	4	4	4	**118**

Notes:
RME - Reasonable Maximum Exposure
MLE - Most Likely Exposure
ing - ingestion
derm - dermal contact
inh - inhalation

* In addition to separate risk calculations, due to proximity, risks for residential receptors for transects 1 and 2 will be added to risks for the recreational teen in CS-B and site M.
** In addition to separate risk calculations, due to proximity, risks for residential receptors for transects 3,4 and 5 will be added to risks for the recreational teen in CS-C and CS-D.
*** In addition to separate risk calculations, due to proximity, risks for residential receptors for transects 6 and 7 will be added to risks for the recreational teen in CS-E.
****There are 116 receptors - each is evaluated for several exposure pathways.
(a) - The residential scenario for area M will consider inhalation of sediment derived dust by nearby residential receptors (i.e., transects 1 and 2) should the lagoon be drained and dried in the future.

TABLE 5-2
SAMPLING IN SUPPORT OF THE HUMAN HEALTH RISK ASSESSMENT
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

Receptor / Exposure Route	Environmental Medium	Sampling Strategy	Number of Samples
Indoor Industrial Worker Inhalation of Indoor Air	Fill Area Waste	At Sites G,H,I,L and N: Collect 1 sample from each of 4 borings at each site.	20 samples
Outdoor Industrial Worker Inhalation of Outdoor Air			
Teenage Trespasser Inhalation of Outdoor Air			
Construction/Utility Worker • Incidental Ingestion of and Dermal Contact with Waste • Inhalation of Particulates and Volatiles			
Outdoor Industrial Worker • Incidental Ingestion of and Dermal Contact with Soil • Inhalation of Particulates and Volatiles	Fill Area Surface Soil *(0-0.5 ft bgs)*	At Sites G,H,I,L and N: Collect 1 sample from each of 4 borings at each site.	20 samples
Teenage Trespasser • Incidental Ingestion of and Dermal Contact with Soil • Inhalation of Particulates and Volatiles			
Construction/Utility Worker • Incidental Ingestion of and Dermal Contact with Soil • Inhalation of Particulates and Volatiles			

TABLE 5-2
SAMPLING IN SUPPORT OF THE HUMAN HEALTH RISK ASSESSMENT
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

Receptor / Exposure Route	Environmental Medium	Sampling Strategy	Number of Samples
Indoor Industrial Worker Inhalation of Indoor Air	Fill Area Groundwater	Indoor air concentrations of VOCs will be modeled based on shallow groundwater concentrations of VOCs.	• Fill Area shallow groundwater - 19 samples from 19 wells.
Outdoor Industrial Worker Inhalation of Outdoor Air		Outdoor air concentrations of VOCs will be modeled based on shallow groundwater concentrations of VOCs.	• Downgradient shallow alluvial aquifer
Construction/Utility Worker Inhalation of Outdoor Air			
Recreational Teenager Inhalation of Outdoor Air			
Construction/Utility Worker Incidental Ingestion of and Dermal Contact with Groundwater		Sample Shallow groundwater. Excavation is generally not expected to exceed 15 ft bgs; however, most shallow samples from each well will be used.	1) Sites G,H, and L: 3-6 samples from 3 locations. 2) Site I: 3-6 samples from 3 locations. 3) Areas southwest of sites G,H, and L: 3-6 samples from 3 wells.
Indoor Industrial Worker Inhalation of Indoor Air	Residential Area Groundwater	Indoor air concentrations of VOCs will be modeled based on shallow groundwater concentrations of VOCs.	Developed and Undeveloped Areas in Dead Creek Floodplain closest to source areas:
Resident Inhalation of Indoor Air			
Outdoor Industrial Worker Inhalation of Outdoor Air		Outdoor air concentrations of VOCs will be modeled based on shallow groundwater concentrations of VOCs.	
Construction/Utility Worker Inhalation of Outdoor Air			
Resident Inhalation of Outdoor Air			
Construction/Utility Worker Incidental Ingestion of and Dermal Contact with Groundwater		Sample Shallow groundwater. Excavation is generally not expected to exceed 15 ft bgs; however, most shallow samples from each well will be used.	6 samples from 2 wells at water table (Walnut St. and Judith Ln.)
Resident Incidental Ingestion of and Dermal Contact with Groundwater		Sample groundwater in the developed and undeveloped areas of the Dead Creek Floodplain.	4 samples from yet to be identified private wells in the Walnut St. and Judith Ln. area.

TABLE 5-2
SAMPLING IN SUPPORT OF THE HUMAN HEALTH RISK ASSESSMENT
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

Receptor / Exposure Route	Environmental Medium	Sampling Strategy	Number of Samples
Construction/Utility Worker • Incidental Ingestion of and Dermal Contact with Soil • Inhalation of Particulates and Volatiles	Residential Area Surface Soils (0-0.5 ft bgs)	Seven transects in undeveloped areas sampled at 200 ft. intervals. Three residences along each of Transects 1-6, and two residences along Transect 7.	45 samples 20 samples
Outdoor Industrial Worker • Incidental Ingestion of and Dermal Contact with Soil • Inhalation of Particulates and Volatiles			
Resident • Incidental Ingestion of and Dermal Contact with Soil • Inhalation of Particulates and Volatiles in Outdoor Air			
Resident • Produce Ingestion		Produce constituent concentrations will be modeled based on surface soil data collected along undeveloped area transects and at residences.	
Construction/Utility Worker • Incidental Ingestion of and Dermal Contact with Soil • Inhalation of Particulates and Volatiles	Residential Area Subsurface Soils (0.5- 6 ft bgs)	Seven transects in undeveloped areas sampled at 200 ft. intervals. Three residences along each of Transects 1-6, and two residences along Transect 7.	45 samples 20 samples
Outdoor Industrial Worker • Inhalation of Volatiles			
Resident • Inhalation of Volatiles			
Indoor Industrial Worker • Inhalation of Volatiles			

TABLE 5-2
SAMPLING IN SUPPORT OF THE HUMAN HEALTH RISK ASSESSMENT
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

Receptor / Exposure Route	Environmental Medium	Sampling Strategy	Number of Samples
Recreational Teenager Incidental Ingestion of and Dermal Contact with Sediment while Wading	Dead Creek Sediment *	Sample undeveloped areas of Dead Creek (CS-B and CS-F) at 200 ft. intervals for industry-specific constituents. Sample developed areas of Dead Creek (CS-C,D and E) at 150 ft. intervals for industry-specific constituents. Sample entire length of Dead Creek at 1000 ft. intervals for full suite of analytes.	50 samples 47 samples 20 samples
	Site M sediment	Sample Site M sediments.	4 samples
Recreational Teenager Incidental Ingestion of and Dermal Contact with Sediment while Swimming Recreational Fisher Incidental Ingestion of and Dermal Contact with Sediment while Wading	Borrow Pit Lake Sediment North of Dead Creek Discharge *	Sample Borrow Pit Lake at 400 ft. intervals for industry-specific constituents.	8 samples
Recreational Teenager Incidental Ingestion of and Dermal Contact with Surface Water while Wading	Dead Creek Surface Water	Sample Dead Creek Surface Water at approximately 1000 ft. intervals for full suite of analytes.	18 samples
Recreational Teenager Incidental Ingestion of and Dermal Contact with Surface Water while Swimming Recreational Fisher Incidental Ingestion of and Dermal Contact with Surface Water while Wading	Borrow Pit Lake Surface Water North of Dead Creek Discharge	Sample Borrow Pit Lake Surface Water at approximately 1000 ft. intervals for site-specific constituents.	2 samples
Recreational Fisher Fish Ingestion	Various Fish in Borrow Pit Lake	9 predator fish, 9 bottom feeding fish and 9 forage fish whole fish samples will be collected. Compositing will be conducted as necessary to achieve appropriate sample size. Data from game fish will be used in the HHRA.	27 samples

Notes:
bgs - below ground surface.
ft - feet.
* In additi(diment sampling conducted in support of the ecological risk assessment will be(in the human heath risk assessment.

TABLE 5-3
SUMMARY OF POTENTIAL EXPOSURE ASSUMPTIONS - INDOOR INDUSTRIAL WORKER
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

Parameter	RME On-Site Indoor Worker		MLE On-Site Indoor Worker	
Parameters Used in the Indoor Air Pathway				
Exposure Time (hr/day)	8	(a)	8	(a)
Exposure Frequency (days/year)	250	(b)	250	(b)
Exposure Duration (yr)	25	(b)	7	(c)
Inhalation Rate (m^3/hour)	1.6	(d)	1.0	(e)
Body Weight (kg)	70	(b)	70	(b)

Notes:
MLE - Most Likely Exposure.
RME - Reasonable Maximum Exposure.
(a) - USEPA, 1997a. Exposure Factors Handbook. 50th percentile time spent at work, males and females, all ages. Table 15-68.
(b) - USEPA, 1991a. Standard Default Exposure Factors.
(c) - USEPA, 1997a. Exposure Factors Handbook. Recommended value for occupational tenure listed in Table 1-2.
(d) - USEPA, 1997a. Exposure Factors Handbook. Inhalation rate for moderate activity.
(e) - USEPA, 1997a. Exposure Factors Handbook. Inhalation rate for light activity.

6/22/99

TABLE 5-4
SUMMARY OF POTENTIAL EXPOSURE ASSUMPTIONS - OUTDOOR INDUSTRIAL WORKER
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

Parameter	RME Future Outdoor Industrial Worker		MLE Future Outdoor Industrial Worker	
Parameters Used in the Outdoor Air Pathway				
Exposure Time (hr/day)	8	(a)	8	(a)
Exposure Frequency (days/year)	190	(i)	190	(i)
Exposure Duration (yr)	25	(b)	7	(c)
Inhalation Rate (m^3/hour)	1.6	(d)	1	(e)
Body Weight (kg)	70	(b)	70	(b)
Parameters Used in the Surface Soil Pathway				
Exposure Frequency (days/year)	190	(i)	190	(i)
Exposure Duration (yr)	25	(b)	7	(c)
Soil Ingestion Rate (mg/day)	50	(f)	30	(j)
Skin Contacting Medium (cm^2)	3339	(g)	3339	(g)
Soil on Skin (mg/cm^2)	0.02	(h)	0.02	(h)
Body Weight (kg)	70	(b)	70	(b)

Notes:
MLE - Most Likely Exposure.
RME - Reasonable Maximum Exposure.
(a) - USEPA, 1997a. Exposure Factors Handbook. 50th percentile time spent at work, males and females, all ages. Table 15-68.
(b) - USEPA, 1991a. Standard Default Exposure Factors.
(c) - USEPA, 1997a. Exposure Factors Handbook. Recommended value for occupational tenure listed in Table 1-2.
(d) - USEPA, 1997a. Exposure Factors Handbook. Inhalation rate for moderate activity.
(e) - USEPA, 1997a. Exposure Factors Handbook. Inhalation rate for light activity.
(f) - USEPA, 1997a. Exposure Factors Handbook. Average soil ingestion rates listed in Table 1-2.
(g) - USEPA, 1997a. Exposure Factors Handbook. Represents 50th percentile values for males and females based on hands, forearms, and face.
(h) - USEPA, 1997a. Exposure Factors Handbook. See Table 5-10 for calculation.
(i) - Exposure frequency of 250 days (USEPA, 1991a) adjusted for percentage of days with inclement weather (24%), [250-(250*0.24) = 190]; see text.
(j) - Calabrese, E.J., et. al. 1990. Preliminary adult soil ingestion estimates; results of a pilot study. Regul. Toxicol. Pharmacol. 12L88-95. As cited in USEPA, 1997a. Exposure Factors Handbook. Low end of range.

6/22/99

TABLE 5-5
SUMMARY OF POTENTIAL EXPOSURE ASSUMPTIONS - TRESPASSING TEENAGER
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

Parameter	**RME Trespassing Teenager (7 to 18 yrs)**		**MLE Trespassing Teenager (7 to 18 yrs)**	
Parameters Used in the Surface Soil Pathway				
Exposure Frequency (days/year)	26	(a)	13	(b)
Exposure Duration (yr)	11	(c)	11	(c)
Soil Ingestion Rate (mg/day)	100	(d)	50	(e)
Skin Contacting Medium (cm^2)	3677	(f)	3677	(f)
Soil on Skin (mg/cm^2)	0.02	(g)	0.02	(g)
Body Weight (kg)	47	(h)	47	(h)
Parameters Used in the Outdoor Air Pathway				
Exposure Time (hr/day)	2	(i)	2	(i)
Exposure Frequency (days/year)	26	(a)	13	(b)
Exposure Duration (yr)	11	(c)	11	(c)
Inhalation Rate (m^3/hour)	1.2	(j)	1	(k)
Body Weight (kg)	47	(h)	47	(h)

Notes:
MLE - Most Likely Exposure.
RME - Reasonable Maximum Exposure.
(a) - 1 day per week for 26 weeks (6 months) of the year.
(b) - 1 day per 2 weeks for 26 weeks (6 months) of the year.
(c) - Trespassing teenager is assumed to range in age from 7 to 18. Therefore, total exposure duration is 11 years.
(d) - USEPA, 1991a. Standard Default Exposure Factors.
(e) - USEPA, 1997a. Exposure Factors Handbook. Average soil ingestion rate for an adult listed in Table 1-2.
(f) - USEPA, 1997a. Exposure Factors Handbook. Average surface are of hands, forearms and lower legs of males and females aged 7 to 18.
(g) - USEPA, 1997a. Exposure Factors Handbook. See Table 5-14 for calculation.
(h) - USEPA, 1997a. Exposure Factors Handbook. Body weight is the average of males and females aged 7 to 18.
(i) - The trespassing teen is assumed to stay in the fill area for two hours.
(j) - USEPA, 1997a. Exposure Factors Handbook. Inhalation rates is the value for moderate activity (children) listed in Table 5-23.
(k) - USEPA, 1997a. Exposure Factors Handbook. Inhalation rates is the value for light activity (children) listed in Table 5-23.

6/22/99

TABLE 5-6
SUMMARY OF POTENTIAL EXPOSURE ASSUMPTIONS - CONSTRUCTION WORKER
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

Parameter	RME Future Construction/Utility Worker		MLE Future Construction/Utility Worker	
Parameters Used in the Surface Soil and Subsurface Soil Inhalation Pathway				
Exposure Time (hr/day)	8	(a)	8	(a)
Exposure Frequency (days/year)	40	(b)	20	(c)
Exposure Duration (yr)	1	(d)	1	(d)
Inhalation Rate (m^3/hour)	2.5	(e)	1.5	(f)
Body Weight (kg)	70	(g)	70	(g)
Parameters Used in the Surface and Subsurface Soil Pathway				
Exposure Frequency (days/year)	40	(b)	20	(c)
Exposure Duration (yr)	1	(d)	1	(d)
Soil Ingestion Rate (mg/day)	100	(g)	64	(h)
Skin Contacting Medium (cm^2)	3339	(i)	3339	(i)
Soil on Skin (mg/cm^2)	0.19	(j)	0.19	(j)
Body Weight (kg)	70	(g)	70	(g)
Parameters Used in the Groundwater Pathway				
Exposure Time (hr/event)	1	(k)	1	(k)
Exposure Frequency (days/year)	10	(k)	5	(k)
Exposure Duration (yr)	1	(d)	1	(d)
Water Ingestion Rate (l/event)	0.005	(l)	0.005	(l)
Skin Contacting Medium (cm^2)	3339	(i)	3339	(i)
Body Weight (kg)	70	(g)	70	(g)
Parameters Used in the Groundwater Inhalation Pathway				
Exposure Time (hr/day)	8	(a)	8	(a)
Exposure Frequency (days/year)	40	(b)	20	(c)
Exposure Duration (yr)	1	(d)	1	(d)
Inhalation Rate (m^3/hour)	2.5	(e)	1.5	(f)
Body Weight (kg)	70	(g)	70	(g)

Notes:
MLE - Most Likely Exposure.
RME - Reasonable Maximum Exposure.
(a) - USEPA, 1997a. Exposure Factors Handbook. 50th percentile time spent at work, males and females, all ages. Table 15-68.
(b) - Exposure frequency is equivalent to 5 days per week for 2 months.
(c) - Exposure frequency is equivalent to five days per week for one month.
(d) - Construction activities are assumed to occur over a 1 year period.
(e) - USEPA, 1997a. Exposure Factors Handbook. Inhalation rate is the value for heavy activity for an outdoor worker listed in Table 5-23.
(f) - USEPA, 1997a. Exposure Factors Handbook. Inhalation rate is the value for moderate activity for an outdoor worker listed in Table 5-23.
(g) - USEPA, 1991a. Standard Default Exposure Factors.
(h) - ENSR-derived value; described briefly in the text.
(i) - USEPA, 1997a. Exposure Factors Handbook. Represents 50th percentile values for males and females based on hands, forearms, and face.
(j) - USEPA, 1997a. Exposure Factors Handbook. See Table 5-11 for calculation.
(k) - Assumed that contact with water occurs only for a fraction of the total exposure duration and time.
(l) - USEPA, 1989a. Risk Assessment Guidance for Superfund, Volume I. Value is one-tenth of that assumed to occur during a swimming event.

6/22/99

TABLE 5-7
SUMMARY OF POTENTIAL EXPOSURE ASSUMPTIONS - RESIDENT
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

Parameter	RME Resident				MLE Resident			
	Adult		Child (0 to 6 yrs)		Adult		Child (0 to 6 yrs)	
Parameters Used in the Outdoor Air Inhalation Pathway								
Exposure Time (hr/day)	2	(a)	6	(a)	2	(a)	6	(a)
Exposure Frequency (days/year)	266	(c)	266	(c)	178	(e)	178	(e)
Exposure Duration (yr)	24	(b)	6	(b)	7	(f)	2	(f)
Inhalation Rate (m^3/hour)	1.6	(g)	1.2	(g)	0.55	(h)	0.32	(i)
Body Weight (kg)	70	(b)	15	(b)	70	(b)	15	(b)
Parameters Used in the Surface Soil Pathway								
Exposure Frequency (days/year)	266	(c)	266	(c)	178	(e)	178	(e)
Exposure Duration (yr)	24	(b)	6	(b)	7	(f)	2	(f)
Soil Ingestion Rate (mg/day)	100	(b)	200	(b)	50	(j)	100	(j)
Skin Contacting Medium (cm^2)	5729	(k)	2058	(k)	5729	(k)	2058	(k)
Soil on Skin (mg/cm^2)	0.12	(l)	0.06	(l)	0.12	(l)	0.06	(l)
Body Weight (kg)	70	(b)	15	(b)	70	(b)	15	(b)
Parameters Used in the Homegrown Produce Pathway								
Exposure Frequency (days/year)	365	(p)	365	(p)	365	(p)	365	(p)
Exposure Duration (yr)	24	(b)	6	(b)	7	(f)	2	(f)
Produce Ingestion Rate (g/day)	525	(m)	113	(m)	147	(n)	31.5	(n)
Body Weight (kg)	70	(b)	15	(b)	70	(b)	15	(b)
Parameters Used in the Indoor Air Inhalation Pathway								
Exposure Time (hr/day)	16.4	(o)	18	(o)	16.4	(o)	18	(o)
Exposure Frequency (days/year)	266	(c)	266	(c)	178	(e)	178	(e)
Exposure Duration (yr)	24	(b)	6	(b)	7	(f)	2	(f)
Inhalation Rate (m^3/hour)	1.6	(g)	1.2	(g)	0.55	(h)	0.32	(i)
Body Weight (kg)	70	(b)	15	(b)	70	(b)	15	(b)
Parameters Used in the Groundwater Pathway								
Exposure Time (hr/event)	1	(r)	1	(r)	1	(r)	1	(r)
Exposure Frequency (days/year)	26	(s)	26	(s)	13	(t)	13	(t)
Exposure Duration (yr)	24	(b)	6	(b)	7	(f)	2	(f)
Water Ingestion Rate (l/event)	0.005	(q)	0.005	(q)	0.001	(u)	0.001	(u)
Skin Contacting Medium (cm^2)	5729	(k)	2058	(k)	5729	(k)	2058	(k)
Body Weight (kg)	70	(b)	15	(b)	70	(b)	15	(b)

Notes:
MLE - Most Likely Exposure.
RME - Reasonable Maximum Exposure.
(a) - USEPA, 1997a. Exposure Factors Handbook. Values for time spent outdoors listed in Table 1-2 (average of weekends /weekdays for children).
(b) - USEPA, 1991a. Standard Default Exposure Factors.
(c) - Exposure frequency of 350 days (USEPA, 1991a) adjusted for percentage of days with inclement weather (24%), [350-(350*0.24) = 266]; See text.
(d) - USEPA, 1993b. Central tendency residential exposure frequency = 234 days.
(e) - Exposure frequency of 234 days (USEPA, 1993b) adjusted for percentage of days with inclement weather (24%), [234 - (234*0.24) = 178]; See text.
(f) - USEPA, 1997a. Exposure Factors Handbook. Recommended average for time residing in a household, Table 1-2. (9 years total, assuming 7 years as an adult and 2 as a child - assumes that the 2 years as a child can occur anywhere between the ages of 0 to 6. Therefore, exposure factors for a 0 to 6 year old child are employed).
(g) - USEPA, 1997a. Exposure Factors Handbook. Inhalation rates are the values for moderate activity listed in Table 5-23.
(h) - USEPA, 1997a. Exposure Factors Handbook. Average daily inhalation rate for men and women, Table 5-23.
(i) - USEPA, 1997a. Exposure Factors Handbook. Average of recommended inhalation rates for children age 0-6 years, Table 5-23.
(j) - USEPA, 1997a. Exposure Factors Handbook. Average soil ingestion rates listed in Table 1-2.
(k) - USEPA, 1997a. Exposure Factors Handbook. Represents average 50th percentile surface area for males and females of *hands, forearms, lower legs, and feet.*
(l) - USEPA, 1997a. Exposure Factors Handbook. See Tables 5-12 and 5-13 for calculation.
(m) - USEPA, 1997a. Exposure Factors Handbook. Based on recommended 95th percentile homegrown vegetable intake of 7.5 g/kg body weight-day, Table 1-2.
(n) - USEPA, 1997a. Exposure Factors Handbook. Based on average homegrown vegetable intake of 2.1 g/kg body weight-day, Table 1-2.
(o) - USEPA, 1997a. Exposure Factors Handbook. Values for time spent indoors listed in Table 1-2 (average of weekends /weekdays for children; assumes that adult spends time away from the household).
(p) - Produce ingestion rate is based on 365 days per year.
(q) - USEPA, 1989a. Risk Assessment Guidance for Superfund, Volume I. Value is one-tenth of that assumed to occur during a swimming event.
(r) - The adult and child are assumed to be in contact with groundwater outdoors for one hour per event.
(s) - Two days per week for three months.
(t) - One day per week for three months.
(u) - USEPA, 1989a. Risk Assessment Guidance for Superfund, Volume I. Value is one-fiftieth of that assumed to occur during a swimming event.

TABLE 5-8
SUMMARY OF POTENTIAL EXPOSURE ASSUMPTIONS - RECREATIONAL TEENAGER
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

Parameter	RME Recreational Teenager (7 to 18 yrs)		MLE Recreational Teenager (7 to 18 yrs)	
Parameters Used in the Dead Creek Sediment Pathway - Wading				
Exposure Frequency (days/year)	26	(a)	13	(b)
Exposure Duration (yr)	11	(c)	11	(c)
Soil Ingestion Rate (mg/day)	100	(d)	50	(e)
Skin Contacting Medium (cm^2)	2029	(f)	2029	(f)
Sediment on Skin (mg/cm^2)	1	(g)	1	(g)
Body Weight (kg)	47	(h)	47	(h)
Parameters Used in the Dead Creek Surface Water Pathway - Wading				
Exposure Frequency (days/year)	26	(a)	13	(b)
Exposure Duration (yr)	11	(c)	11	(c)
Surface Water Ingestion Rate (l/event)	0.01	(i)	0.005	(j)
Skin Contacting Medium (cm^2)	2029	(f)	2029	(f)
Body Weight (kg)	47	(h)	47	(h)
Paramaters Used in the Borrow Pit Lake Sediment Pathway - Swimming				
Exposure Frequency (days/year)	12	(k)	6	(l)
Exposure Duration (yr)	11	(c)	11	(c)
Soil Ingestion Rate (mg/day)	100	(d)	50	(e)
Skin Contacting Medium (cm^2)	2029	(f)	2029	(f)
Sediment on Skin (mg/cm^2)	1	(g)	1	(g)
Body Weight (kg)	47	(h)	47	(h)
Parameters Used in the Borrow Pit Lake Surface Water Pathway - Swimming				
Exposure Frequency (days/year)	12	(k)	6	(l)
Exposure Duration (yr)	11	(c)	11	(c)
Surface Water Ingestion Rate (l/event)	0.05	(m)	0.01	(i)
Skin Contacting Medium (cm^2)	13533	(n)	13533	(n)
Body Weight (kg)	47	(h)	47	(h)

Notes:
MLE - Most Likely Exposure.
RME - Reasonable Maximum Exposure.
(a) - 1 day per week for 26 weeks (6 months) of the year.
(b) - 1 day per 2 weeks for 26 weeks (6 months) of the year.
(c) - Recreational teenager is assumed to range in age from 7 to 18. Therefore, total exposure duration is 11 years.
(d) - USEPA, 1991a. Standard Default Exposure Factors.
(e) - USEPA, 1997a. Exposure Factors Handbook. Average soil ingestion rate for an adult listed in Table 1-2.
(f) - USEPA, 1997a. Exposure Factors Handbook. Average surface are of feet and 1/4 the legs of males and females aged 7-18.
(g) - USEPA, 1992b. Dermal Exposure Assessment: Principles and Applications.
(h) - USEPA, 1997a. Exposure Factors Handbook. Body weight is the average of males and females aged 7-18.
(i) - USEPA, 1989a. Risk Assessment Guidance for Superfund, Volume I. Value is one-fifth of that assumed to occur during a swimming event.
(j) - USEPA, 1989a. Risk Assessment Guidance for Superfund, Volume I. Value is one-tenth of that assumed to occur during a swimming event.
(k) - Two events per month for the 6 warmest months of the year.
(l) - One events per month for the 6 warmest months of the year.
(m) - USEPA, 1989a. Risk Assessment Guidance for Superfund, Volume I. Value for a swimming event.
(n) - Value represents average total body surface area of males and females aged 7 to 18. Assumed 100% of skin surface exposed while swimming.

6/22/99

TABLE 5-9
SUMMARY OF POTENTIAL EXPOSURE ASSUMPTIONS - RECREATIONAL FISHER
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

Parameter	RME Adult Recreational Fisher		MLE Adult Recreational Fisher	
Parameters Used in the Fish Ingestion Pathway				
Exposure Frequency (days/year)	365	(a)	365	(a)
Exposure Duration (yr)	30	(b)	9	(c)
Fish Ingestion Rate (g/day)	8	(d)	1	(e)
Body Weight (kg)	70	(b)	70	(b)
Parameters Used in the Surface Water Pathway - Wading				
Exposure Frequency (days/year)	22	(k)	3	(l)
Exposure Duration (yr)	30	(b)	9	(c)
Surface Water Ingestion Rate (l/event)	0.01	(f)	0.005	(m)
Skin Contacting Medium (cm^2)	4500	(g)	4500	(g)
Body Weight (kg)	70	(b)	70	(b)
Paramaters Used in the Sediment Pathway - Wading				
Exposure Frequency (days/year)	22	(k)	3	(l)
Exposure Duration (yr)	30	(b)	9	(c)
Sediment Ingestion Rate (mg/day)	100	(h)	50	(i)
Skin Contacting Medium (cm^2)	4500	(g)	4500	(g)
Sediment on Skin (mg/cm^2)	1	(j)	1	(j)
Body Weight (kg)	70	(b)	70	(b)

Notes:
MLE - Most Likely Exposure.
RME - Reasonable Maximum Exposure.
(a) - Fish ingestion rates are based on 365 days per year.
(b) - USEPA, 1991a. Standard Default Exposure Factors.
(c) - USEPA, 1997a. Exposure Factors Handbook. Recommended average for time residing in a household. Table 1-2.
(d) - USEPA, 1997a. Exposure Factors Handbook. 8 g/day is equivalent to approximately 22 fish meals of 129 g per year.
(e) - 1 g/day is equivalent to approximately three 129 g fish meals per year (equivalent to one fish meal per month in the three summer months).
(f) - USEPA, 1989a. Risk Assessment Guidance for Superfund, Volume I. Value is one-fifth of that assumed to occur during a swimming event.
(g) - USEPA, 1997a. Exposure Factors Handbook. Represents 50th percentile values for males and females based on hands, lower legs, and feet.
(h) - USEPA, 1991a. Standard Default Exposure Factors.
(i) - USEPA, 1997a. Exposure Factors Handbook. Average soil ingestion rates listed in Table 1-2.
(j) - USEPA, 1992b. Dermal Exposure Assessment: Principles and Applications.
(k) - One day per month for 5 months.
(l) - One day per month during the three summer months.
(m) - USEPA, 1989a. Risk Assessment Guidance for Superfund, Volume I. Value is one-tenth of that assumed to occur during a swimming event.

6/22/99

TABLE 5-10
SOIL ADHERANCE FACTORS- OUTDOOR INDUSTRIAL WORKER
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

Body Part	Outdoor Industrial Worker Scenario Surface Area 50th percentile (cm^2) (a)	Soil Loading Groundskeeper (mg/cm^2) (b)	Total Soil Mass (mg)
Head	1,205	0.005	5.543
Hands	904	0.071	64.1485
Forearms	1,230	0.009	11.1438
Total	3,339		80.8
Area-Weighted Soil Adherence factor (mg/cm2) = Soil mass/Surface area =			0.02

Notes:
(a) - Data from U.S. EPA (1997a). Tables 6-2, 6-3. Average of 50th percentile values for men and women (1/2 arm used as proxy for female forearm).
(b) - Data from U.S. EPA (1997a), Table 6-12. Average of Groundskeeper Nos. 1,2,3,4, and 5.

TABLE 5-11
SOIL ADHERANCE FACTORS- CONSTRUCTION WORKER
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

Body Part	Construction Worker Scenario Surface Area 50th percentile (cm^2) (a)	Soil Loading Farmer (mg/cm^2) (a)	Total Soil Mass (mg)
Head	1,205	0.041	49.405
Hands	904	0.47	424.645
Forearms	1,230	0.13	159.9
Total	3,339		634.0
Area-Weighted Soil Adherence factor (mg/cm2) = Soil mass/Surface area =			0.19

Notes:
(a) - Data from U.S. EPA (1997a). Tables 6-2, 6-3. Average of 50th percentile values for men and women (1/2 arm used as proxy for female forearm).
(b) - Data from U.S. EPA (1997a), Table 6-12. Average of Farmer Nos. 1 and 2.

TABLE 5-12
SOIL ADHERENCE FACTORS- RESIDENT ADULT
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

Body Part	Adult Resident Surface Area 50th percentile (a) (cm^2)	Adult Resident Soil Loading Gardeners (mg/cm^2) (b)	Adult Resident Total Soil Mass (mg)
Hands	904	0.19	171.67
Forearms	1,230	0.052	63.96
Lower legs	2,370	0.047	111.39
Feet	1,225	0.215	347.02
Total	5,729	--	694.03
Area-Weighted Soil Adherence factor (mg/cm2) = Soil mass/Surface area =			0.12

Notes:
(a) - Data from U.S. EPA (1997a). Tables 6-2, 6-3. Average of 50th percentile values for men and women (1/2 arm used as proxy for female forearm).
(b) - Data from U.S. EPA (1997a) Table 6-12. Average of gardeners Nos. 1 and 2.

TABLE 5-13
SOIL ADHERENCE FACTORS- RESIDENT CHILD
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

Body Part	Child Resident (0 to 6 years old) Surface Area 50th percentile (a) (cm^2)	Child Resident (0 to 6 years old) Soil Loading Day Care Kids (mg/cm^2) (b)	Child Resident (0 to 6 years old) Total Soil Mass (mg)
Hands	358	0.0923	33.04
Forearms	437	0.0230	10.05
Lower legs	812	0.0195	15.83
Feet	451	0.0646	58.93
Total	2,058	--	117.86
Area-Weighted Soil Adherence factor (mg/cm2) = Soil mass/Surface area =			0.06

Notes:
(a) - Data from U.S. EPA (1997a). Based on average of boys (Table 6-6) and girls (Table 6-7) total body surface area (6,557 cm2), and mean percentages of total surface area for individual body parts Table 6-8).
(b) - Data from U.S. EPA (1997a), Table 6-12, Daycare kids Nos. #1a, #1b ,#2c, #3.

TABLE 5-14
SOIL ADHERENCE FACTORS- TRESPASSING TEENAGER (7 TO 18)
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

	Trespassing Teenager (7 to 18)		
Body Part	**Surface Area 50th percentile (a) (cm^2)**	**Soil Loading Soccer Kids (mg/cm^2) (b)**	**Total Soil Mass (mg)**
Hands	715	0.0547	39.09
Forearms	894	0.0061	5.42
Lower legs	2,068	0.0177	36.60
Total	3,677	–	
Area-Weighted Soil Adherence factor (mg/cm2) = Soil mass/Surface area =			0.02

Notes:
(a) - Data from U.S. EPA (1997a). Based on average of boys (Table 6-6) and girls (Table 6-7) total body surface area , and mean percentages of total surface area for individual body parts Table 6-8).
(b) - Data from U.S. EPA (1997a) Table 6-12. Average of Soccer Kids Nos. 1, 2, and 3.

6.0 RISK CHARACTERIZATION

The purpose of the risk characterization is to provide estimates of the potential risk to human health from exposure to COPC at or from the site by receptors at or near the site. To accomplish this objective, this section will include quantitative estimates of potential carcinogenic and noncarcinogenic risk.

The results of the exposure assessment are combined with the results of the dose-response assessment to derive quantitative estimates of risk, or the probability of adverse health effects following assumed potential exposure to the COPCs. Using the exposure point concentrations derived in the exposure assessment, each exposure pathway for each receptor will be evaluated for both potential carcinogenic and noncarcinogenic effects.

6.1 Carcinogenic Risk Characterization

The purpose of carcinogenic risk characterization is to estimate the upper-bound likelihood, over and above the background cancer rate, that a receptor will develop cancer in his or her lifetime as a result of exposure to a chemical in environmental media at the site. This likelihood is a function of the dose of a chemical (described in the Exposure Assessment) and the Cancer Slope Factor (CSF) (described in the Toxicity Assessment) for that chemical. The Excess Lifetime Cancer Risk (ELCR) is the likelihood over and above the background cancer rate, which currently in the U.S. is between 1 in 3 and 1 in 4 (Landis et al., 1998), that an individual will contract cancer in his or her lifetime. The risk value is expressed as a probability (e.g., 10^{-6}, or one in one million). The relationship between the ELCR and the estimated Lifetime Average Daily Dose (LADD) of a chemical may be expressed as:

$$ELCR = 1-e^{-(CSF \times LADD)}$$

When the product of the CSF and the LADD is much greater than 1, the ELCR approaches 1 (i.e., 100 percent probability). When the product is less than 0.01 (one chance in 100), the equation can be closely approximated by:

$$ELCR = LADD\ (mg/kg\text{-}day) \times CSF\ (mg/kg\text{-}day)^{-1}$$

The product of the CSF and the LADD is unitless, and provides an upper-bound estimate of the potential carcinogenic risk associated with a receptor's exposure to that chemical via that pathway.

The potential carcinogenic risk for each exposure pathway will be calculated for each receptor. In current regulatory risk assessment, it is assumed that cancer risks are additive or cumulative. Pathway and area-specific risks will be summed to estimate the total site potential cancer risk for each receptor. A summary of the total site cancer risks for each receptor group will be presented in this section and compared to the USEPA's target risk range of 10^{-4} to 10^{-6}. Any COPC that causes an exceedance of 10^{-4} risk level for a particular receptor will be designated a COC. Both RME and MLE results will be considered in the identification of COC. Remedial goals (RGs) will be calculated for each COC.

6.2 Noncarcinogenic Risk Characterization

The potential for exposure to a chemical to result in adverse noncarcinogenic health effects is estimated for each receptor by comparing the Chronic Average Daily Dose (CADD) for each COPC with the RfD for that COPC. The resulting ratio, which is unitless, is known as the Hazard Quotient (HQ) for that chemical. The HQ is calculated using the following equation:

$$HQ = \frac{CADD\ (mg/kg\text{-}day)}{RfD\ (mg/kg\text{-}day)}$$

The target HQ is defined as an HQ of less than or equal to one (U.S. EPA, 1989a). When the HQ is less than or equal to 1, the RfD has not been exceeded, and no adverse noncarcinogenic effects are expected. If the HQ is greater than 1, there may be a potential for adverse noncarcinogenic health effects to occur; however, the magnitude of the HQ cannot be directly equated to a probability or effect level.

The total Hazard Index (HI) is calculated for each exposure pathway by summing the HQs for each individual chemical. The total site HI will be calculated for each potential receptor by summing the HIs for each pathway associated with the receptor. If the total site HI is greater than one for any receptor, a more detailed evaluation of potential noncarcinogenic effects based on specific health endpoints will be performed (USEPA, 1989a; IEPA, 1998).

A summary of all HI for each receptor group will be presented in this section and compared to the USEPA's target hazard index of one. COPC that causes an exceedance of the Hazard Index of 1 for a particular receptor and target endpoint will be designated a COC. Both RME and MLE results will be considered in the identification of COC. Remedial goals will be calculated for each COC.

6.3 Risk Assessment Refinement

As stated in the AOC SOW, the risk assessment for Sauget Area 1 is a streamlined HHRA, and as such, utilizes conservative exposure and toxicity parameters. The results of the HHRA will be reviewed and the risk drivers identified. Solutia may choose to refine the risk estimates by using, for example, the following: site-specific exposure data (creel census or well survey), site-specific bioavailability factors, or probabilistic (or Monte Carlo) analysis. Use of such refinements, such as a probabilistic risk assessment, will allow the public to put the risks in perspective and provide information that the risk manager needs to more accurately characterize risks on a site-specific basis and to communicate the nature of the risks to the public.

6.4 Cumulative Risk

Although the AOC SOW identifies separate risk evaluations for groundwater and other media, many potential receptors identified herein are assumed to be exposed to both groundwater and other media simultaneously. To account for cumulative risk, the risk assessment will be conducted for all media, and total site risks will be calculated for each receptor. COC for potentially carcinogenic and noncarcinogenic effects will be identified, and pathways that contribute significantly to target risk exceedances will be identified. RGs will be calculated for appropriate COPC in the appropriate medium. RGs will be presented for COC in groundwater in the RI/FS report, and RGs will be presented for other media in the EE/CA report.

6.5 Uncertainty Analysis

Uncertainty is introduced into the risk assessment in several places throughout the process. Every time an assumption is made, some level of uncertainty is introduced into the risk assessment. In accordance with USEPA guidance (USEPA, 1989a), the uncertainty associated with each step of the risk characterization process will be discussed in this section of the report.

There are many potential sources of uncertainty in the risk assessment process; some are more important than others. The major areas of uncertainty include: the adequacy of the sampling plan, the quality of the analytical data, assumptions about the frequency, duration, and magnitude of exposure, the receptors identified, assumptions made in the modeling performed to predict concentrations at locations where measurement data are lacking, and the availability and accuracy of dose-response data. The uncertainties will be discussed qualitatively in the report, including steps taken to compensate for uncertainty, and the impact on the risk assessment results.

7.0 SUMMARY AND CONCLUSIONS

A summary and conclusions section will contain discussions of the results of the risk assessment. The selection of final COC and the remedial goals for each COC will be presented.

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APPENDIX A

DATA QUALITY LEVELS FOR HUMAN HEALTH RISK ASSESSMENT

TABLE 1
DATA QUALITY LIMITS (DQLs) FOR SOIL AND SEDIMENT
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

CONSTITUENT	CAS NO.	DQL (mg/kg) (q)	Basis
TCL Volatiles			
1,1,1-Trichloroethane	71-55-6	2.00E+00	A
1,1,2,2-Tetrachloroethane	79-34-5	3.60E-01	F
1,1,2-Trichloroethane	79-00-5	2.00E-02	A
1,1-Dichloroethane	75-34-3	1.77E+00	B
1,1-Dichloroethylene	75-35-4	4.62E-03	B
1,2-Dichloroethane	107-06-2	2.00E-02	A
1,2-Dichloroethylene (total)	540-59-0	3.64E-02	B
1,2-Dichloropropane	78-87-5	1.00E-02	B
2-Butanone	78-93-3	6.90E+03	E
2-Hexanone	591-78-6	7.50E+02 (m)	E
4-Methyl-2-pentanone	108-10-1	7.50E+02	E
Acetone	67-64-1	1.23E+00	B
Benzene	71-43-2	3.00E-02	A
Bromodichloromethane	75-27-4	6.00E-01	A
Bromoform	75-25-2	8.00E-01	A
Bromomethane	74-83-9	3.80E+00	E
Carbon Disulfide	75-15-0	4.57E+00	B
Carbon tetrachloride	56-23-5	7.00E-02	A
Chlorobenzene	108-90-7	7.69E-02	B
Chloroethane	75-00-3	1.53E+02 (p)	F
Chloroform	67-66-3	3.00E-01	C
Chloromethane	74-87-3	1.20E+00	F
cis-1,3-Dichloropropene	10061-01-5	4.00E-03	A
Dibromochloromethane	124-48-1	4.00E-01	A
Ethyl Benzene	100-41-4	1.00E+00	B
Methylene chloride	75-09-2	2.00E-02	A
Styrene	100-42-5	3.08E-01	B
Tetrachloroethene	127-18-4	6.00E-02	A
Toluene	108-88-3	9.23E-01	B
Total Xylenes	1330-20-7	2.11E+01 (d)	B
trans-1,3-Dichloropropene	10061-02-6	4.00E-03	A
Trichloroethene	79-01-6	6.00E-02	A
Vinyl chloride	75-01-4	1.00E-02	A
TCL Semi-Volatiles			
1,2,4-Trichlorobenzene	120-82-1	2.50E+00	B
1,2-Dichlorobenzene	95-50-1	1.70E+01	A
1,3-Dichlorobenzene	541-73-1	2.00E+00 (e)	A
1,4-Dichlorobenzene	106-46-7	2.00E+00	A
2,2'-oxybis(1-Chloropropane)	108-60-1	2.54E+00	F
2,4,5-Trichlorophenol	95-95-4	6.40E+01	H
2,4,6-Trichlorophenol	88-06-2	7.00E-02	H
2,4-Dichlorophenol	120-83-2	6.90E-01	H
2,4-Dimethylphenol	105-67-9	9.00E-01	B
2,4-Dinitrophenol	51-28-5	1.10E+02	E
2,4-Dinitrotoluene	121-14-2	8.00E-04	A
2,6-Dinitrotoluene	606-20-2	7.00E-04	A
2-Chloronaphthalene	91-58-7	3.70E+03	E
2-Chlorophenol	95-57-8	3.10E+00	H
2-Methylnaphthalene	91-57-6	8.40E+01	A
2-Methylphenol	95-48-7	1.67E+00	B
2-Nitroaniline	88-74-4	3.30E+00	E
2-Nitrophenol	88-75-5	3.40E+03 (n)	E
3,3'-Dichlorobenzidine	91-94-1	7.00E-03	A
3-Nitroaniline	99-09-2	3.30E+00 (o)	E
4,6-Dinitro-2-methylphenol	534-52-1	NA	K
4-Bromophenyl phenyl ether	101-55-3	NA	K

TABLE 1
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SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

CONSTITUENT	CAS NO.	DQL (mg/kg) (q)		Basis
4-Chloraniline	106-47-8	3.50E-01		B
4-Chloro-3-methylphenol	59-50-7	NA		K
4-Chlorophenol phenyl ether	7005-72-3	NA		K
4-Methylphenol	106-44-5	1.67E+00	(g)	B
4-Nitroaniline	100-01-6	3.30E+00	(o)	E
4-Nitrophenol	100-02-7	3.40E+03		E
Acenaphthene	83-32-9	4.38E+01		B
Acenaphthylene	208-96-8	4.38E+01	(h)	B
Anthracene	120-12-7	1.20E+04		A
Benz[a]anthracene	56-55-3	9.00E-01		D
Benzo[a]pyrene	50-32-8	9.00E-02		D
Benzo[b]fluoranthene	205-99-2	9.00E-01		D
Benzo[g,h,i]perylene	191-24-2	1.77E+02	(a)	B,D
Benzo[k]fluoranthene	207-08-9	9.00E+00		D
bis(2-Chloroethoxy)methane	111-91-1	NA		K
bis(2-Chloroethyl)ether	111-44-4	4.00E-04		A
bis(2-Ethylhexyl)phthalate	117-81-7	4.60E+01		A
Butyl benzyl phthalate	85-68-7	9.30E+02		A
Carbazole	86-74-8	6.00E-01		A
Chrysene	218-01-9	8.80E+01		D
Dibenz[a,h]anthracene	53-70-3	9.00E-02		D
Dibenzofuran	132-64-9	2.10E+02		E
Diethylphthalate	84-66-2	4.70E+02		A
Dimethyl phthalate	131-11-3	1.00E+05		G
Di-n-butyl phthalate	84-74-2	2.30E+03		A
Di-n-octyl phthalate	117-84-0	1.23E+02		B,D
Fluoranthene	206-44-0	2.38E+02		B,D
Fluorene	86-73-7	5.60E+01		B
Hexachlorobenzene	118-74-1	7.00E-02		D
Hexachlorobutadiene	87-68-3	5.70E+00		F
Hexachlorocyclopentadiene	77-47-4	3.33E+00		B,C
Hexachloroethane	67-72-1	5.00E-01		A
Indeno[1,2,3-cd]pyrene	193-39-5	9.00E-01		D
Isophorone	78-59-1	8.00E+00		A
Naphthalene	91-20-3	8.40E+01		
Nitrobenzene	98-95-3	7.69E-03		B
N-Nitroso-di-n-propylamine	621-64-7	5.00E-05		A
N-Nitrosodiphenylamine	86-30-6	1.00E+00		A
Pentachlorophenol	87-86-5	2.00E-02		H
Phenanthrene	85-01-8	1.20E+04	(b)	A
Phenol	108-95-2	1.43E+01		B
Pyrene	129-00-0	1.77E+02		B,D
TAL Metals				
Aluminum	7429-90-5	7.50E+04		E
Antimony	7440-36-0	5.00E+00		H
Arsenic	7440-38-2	4.00E-01		D
Barium	7440-39-3	2.60E+02		H
Beryllium	7440-41-7	1.00E-01		D
Cadmium	7440-43-9	1.00E+00		H
Calcium	7440-70-2	NA		J
Chromium	7440-47-3	2.80E+01	(c)	H
Cobalt	7440-48-4	4.70E+03		D

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SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

CONSTITUENT	CAS NO.	DQL (mg/kg) (q)	Basis
Iron	7439-89-6	2.20E+04	E
Lead	7439-92-1	4.00E+02	D
Magnesium	7439-95-4	NA	J
Manganese	7439-96-5	4.11E+02	D
Mercury	7439-97-6	1.00E-01	H
Nickel	7440-02-0	2.00E+01	C
Potassium	7440-09-7	NA	J
Selenium	7782-49-2	2.40E+00	H
Silver	7440-22-4	2.40E-01	H
Sodium	7440-23-5	NA	J
Thallium	7440-28-0	1.60E+00	H
Vanadium	7440-62-2	5.50E+02	D
Copper	7440-50-8	3.30E+02	H
Zinc	7440-66-6	1.00E+03	H
Cyanide	57-12-5	4.00E+01	H
Pesticides			
Alpha-BHC	319-84-6	5.00E-04	A
Beta-BHC	319-85-7	5.00E-04 (j)	A
Delta-BHC	319-86-8	5.00E-04 (j)	A
Gamma-BHC (Lindane)	58-89-9	9.00E-03	A
Aldrin	309-00-2	4.00E-02	D
alpha-Chlordane	5103-71-9	5.00E-01 (i)	D
gamma-Chlordane	5103-74-2	5.00E-01 (i)	D
Chlordane	57-74-9	5.00E-01	D
Chlorobenzilate	510-15-6	1.60E+00	F
1,2-Dibromo-3-Chloropropane	96-12-8	2.00E-03	A
4,4'-DDD	72-54-8	3.00E+00	D

TABLE 1
DATA QUALITY LIMITS (DQLs) FOR SOIL AND SEDIMENT
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

CONSTITUENT	CAS NO.	DQL (mg/kg) (q)		Basis
4,4'-DDE	72-55-9	2.00E+00		D
4,4'-DDT	50-29-3	2.00E+00		D
Diallate	2303-16-4	7.30E+00		F
Dieldrin	60-57-1	4.00E-03		A
Endosulfan I	959-98-8	1.38E+00	(k)	B
Endosulfan II	33213-65-9	1.38E+00	(k)	B
Endosulfan sulfate	1031-07-8	1.38E+00	(k)	B
Endrin	72-20-8	7.69E-02		B
Endrin aldehyde	7421-93-4	7.69E-02	(l)	B
Endrin Ketone	53494-70-5	7.69E-02	(l)	B
Heptachlor	76-44-8	1.00E-01		C,D
Heptachlor epoxide	1024-57-3	7.00E-02		D
Hexachlorobenzene	118-74-1	4.00E-01		D
Hexachlorocyclopentadiene	77-47-4	3.33E+00		B,C
Isodrin	465-73-6	NA		K
Methoxychlor	72-43-5	2.29E+01		B
Toxaphene	8001-35-2	6.00E-01		D
Herbicides				
2,4-D	94-75-7	1.36E-01		B
2,4-DB	94-82-6	4.40E+02		E
2,4,5-TP	93-72-1	1.10E+01		H
2,4,5-T	93-76-5	7.82E+02	(p)	E
Dalapon	75-99-0	6.54E-02		B
Dicamba	1918-00-9	1.60E+03		E
Dichloroprop	120-36-5	NA		K
Dinoseb	88-85-7	2.50E-01		H
MCPA	94-74-6	3.91E+01	(p)	E
MCPP	93-65-2	7.82E+01	(p)	E
4-Nitrophenol	100-02-7	3.40E+03		E
Pentachlorophenol	87-86-5	2.00E-02		H
Dioxins and Furans				
2,3,7,8-TCDD	1746-01-6	1.00E-03		I
1,2,3,7,8-PentaCDD	40321-76-4	1.00E-03		I
1,2,3,4,7,8-HexaCDD	39227-28-6	1.00E-03		I
1,2,3,6,7,8-HexaCDD	57653-85-7	1.00E-03		I
1,2,3,7,8,9-HexaCDD	19408-74-3	1.00E-03		I
1,2,3,4,6,7,8-HeptaCDD	35822-39-4	1.00E-03		I
OctaCDD	3268-87-9	1.00E-03		I
2,3,7,8-TetraCDF	51207-31-9	1.00E-03		I
1,2,3,7,8-PentaCDF	57117-41-6	1.00E-03		I
2,3,4,7,8-PentaCDF	57117-31-4	1.00E-03		I
1,2,3,4,7,8-HexaCDF	70648-26-9	1.00E-03		I
1,2,3,6,7,8-HexaCDF	57117-44-9	1.00E-03		I
1,2,3,7,8,9-HexaCDF	72918-21-9	1.00E-03		I
2,3,4,6,7,8-HexaCDF	60851-34-5	1.00E-03		I
1,2,3,4,6,7,8-HeptaCDF	67562-39-4	1.00E-03		I
1,2,3,4,7,8,9-HeptaCDF	55673-89-7	1.00E-03		I
OctaCDF	39001-02-0	1.00E-03		I

TABLE 1
DATA QUALITY LIMITS (DQLs) FOR SOIL AND SEDIMENT
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

CONSTITUENT	CAS NO.	DQL (mg/kg) (q)	Basis
TPH			
GRO	NA	5.00E+00	L
DRO	NA	4.00E+00	L
Additional (added 4/17/99)			
Copper,method 7211	7440-50-8	3.30E+02	H
Zinc, method 7151	7440-66-6	1.00E+03	H
TOC, method 9060	NA	NA	K
TPH, method 8015B	NA	5.00E+00	L
Naphthalene	91-20-3	8.40E+01	B
Total PCBs	NA	1.00E+00	M

Notes:
(a) Due to structural similarities, the value for Pyrene was used.
(b) Due to structural similarities, the value for Anthracene was used.
(c) Value for Chromium IV.
(d) Value for o-Xylene.
(e) IEPA, 1998, No Appendix Table B value available, therefore, due to structural similarities, value for 1,2-Dichlorobenene used.
(f) Due to structural similarities, the value for Naphthalene was used.
(g) Due to structural similarities, the value for 2-Methylphenol was used.
(h) Due to structural similarities, the value for Acenaphthene was used.
(i) Due to structural similarities, the value for Chlordane was used.
(j) Due to structural similarities, the value for alpha-BHC was used.
(k) Due to structural similarities, the value for Endosulfan was used.
(l) Due to structural similarities, the value for Endrin was used.
(m) Due to structural similarities, the value for 4-Methyl 2-Pentanone was used.
(n) Due to structural similarities, the value for 4-Nitrophenol was used.
(o) Due to structural similarities, the value for 2-Nitroaniline was used.
(p) PRG calculated based on equations in PRG table.
(q) - The following hierarchy was used to determine the appropriate DQL:
1. The lower of Illinois Tiered Approach to Corrective Action (TACO) Program Tier 1 values from Appendix B, Table C or Appendix B, Table A, with adjustmentsmade for additivity for noncarcinogens.
2. For constituents not listed on Appendix B, Table A, Region IX PRGs for residential soil were used.

CAS = Chemical Abstracts Service.
CB = Chlorobiphenyl.
CDD = Chlorodibenzodioxin.
CDF = Chlorodibenzofuran.
DQL = Data Quality Limit.
NA - Not Available.
PCB = Polychlorinated Biphenyl.
PRG = USEPA Region 9 Preliminary Remediation Goal (USEPA, 1998c).
TAL = Target Analyte List.
TCL = Target Compound List.
TPH = Total Petroleum Hydrocarbons.
A = IEPA, 1998, Appendix B, Table A, Value for Class I Groundwater.
B = IEPA, 1998, Appendix B, Table A, Value for Class I Groundwater adjusted for additivity of noncarcinogenic effects.
C = IEPA, 1998, Appendix B, Table A, Value for Inhalation.
D = IEPA, 1998, Appendix B, Table A, Value for Ingestion.
E = Region IX PRG based on noncarcinogenic effects.
F = Region IX PRG based on carcinogenic effects.
G = Region IX PRG based on ceiling limit.
H = IEPA, 1998, Appendix B, Table C. Lowest value was selected.
I = USEPA, 1998g. Value for Dioxins.
J = No value is available as this constituent is an essential nutrient.
K = No toxicity information is available for this constituent therefore DQL was not developed.
L = Estimated data quality limits based on previous testing.
M = USEPA, 1998f. PCB Mega Rule.

TABLE 2
DATA QUALITY LIMITS (DQLs) FOR SURFACE WATER AND GROUNDWATER
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

CONSTITUENT	CAS NO.	Surface Water (m) DQL (mg/L)	Ground Water (a) DQL (mg/L)	Ground Water (a) Basis	Selected DQL (p) (mg/L)
TCL Volatiles					
1,1,1-Trichloroethane	71-55-6	NA	0.2	B	2.00E-01
1,1,2,2-Tetrachloroethane	79-34-5	0.011	0.000055	C (ca)	5.50E-05
1,1,2-Trichloroethane	79-00-5	0.042	0.005	B	5.00E-03
1,1-Dichloroethane	75-34-3	NA	0.7	B	7.00E-01
1,1-Dichloroethylene	75-35-4	0.0032	0.007	B	3.20E-03
1,2-Dichloroethane	107-06-2	0.099	0.00003	A	3.00E-05
1,2-Dichloroethylene (total)	540-59-0	140	0.07 (c)	B	7.00E-02
1,2-Dichloropropane	78-87-5	0.039	0.005	B	5.00E-03
2-Butanone	78-93-3	NA	1.9	C (nc)	1.90E+00
2-Hexanone	591-78-6	NA	0.16 (g)	C (nc)	1.60E-01
4-Methyl-2-pentanone	108-10-1	NA	0.16	C (nc)	1.60E-01
Acetone	67-64-1	NA	0.7	B	7.00E-01
Benzene	71-43-2	0.071	0.005	B	5.00E-03
Bromodichloromethane	75-27-4	0.046	0.00002	B	2.00E-05
Bromoform	75-25-2	0.36	0.0002	B	2.00E-04
Bromomethane	74-83-9	NA	0.0098	B	9.80E-03
Carbon Disulfide	75-15-0	NA	0.7	B	7.00E-01
Carbon tetrachloride	56-23-5	0.0044	0.00003	A	3.00E-05
Chlorobenzene	108-90-7	21	0.1	B	1.00E-01
Chloroethane	75-00-3	NA	1.26E+01 (o)	C (ca)	1.26E+01
Chloroform	67-66-3	0.47	0.00002	B	2.00E-05
Chloromethane	74-87-3	NA	0.0015	C (ca)	1.50E-03
cis-1,3-Dichloropropene	10061-01-5	1.7	0.001	B	1.00E-03
Dibromochloromethane	124-48-1	0.034	0.14	B	3.40E-02
Ethyl Benzene	100-41-4	29	0.7	B	7.00E-01
Methylene chloride	75-09-2	1.6	0.005	B	5.00E-03
Styrene	100-42-5	NA	0.1	B	1.00E-01
Tetrachloroethene	127-18-4	0.00885	0.00001	A	1.00E-05
Toluene	108-88-3	200	1	B	1.00E+00
Total Xylenes	1330-20-7	NA	10	B	1.00E+01
trans-1,3-Dichloropropene	10061-02-6	1.7	0.001	B	1.00E-03
Trichloroethene	79-01-6	0.081	0.005	B	5.00E-03
Vinyl chloride	75-01-4	0.525	0.00006	A	6.00E-05
TCL Semi-Volatiles					
1,2,4-Trichlorobenzene	120-82-1	0.94	0.07	B	7.00E-02
1,2-Dichlorobenzene	95-50-1	17	0.6	B	6.00E-01
1,3-Dichlorobenzene	541-73-1	2.6	0.075	B	7.50E-02
1,4-Dichlorobenzene	106-46-7	2.6	0.075	B	7.50E-02
2,2'-oxybis(1-Chloropropane)	108-60-1	170	0.00027	C (ca)	2.70E-04
2,4,5-Trichlorophenol	95-95-4	9.8	0.7	B	7.00E-01
2,4,6-Trichlorophenol	88-06-2	0.0065	0.0064	B	6.40E-03
2,4-Dichlorophenol	120-83-2	0.79	0.021	B	2.10E-02
2,4-Dimethylphenol	105-67-9	2.3	0.14	B	1.40E-01
2,4-Dinitrophenol	51-28-5	14	0.014	B	1.40E-02
2,4-Dinitrotoluene	121-14-2	0.0091	0.00002	B	2.00E-05
2,6-Dinitrotoluene	606-20-2	NA	0.0001	B	1.00E-04
2-Chloronaphthalene	91-58-7	4.3	0.49	C (nc)	4.90E-01
2-Chlorophenol	95-57-8	0.4	0.035	B	3.50E-02
2-Methylnaphthalene	91-57-6	NA	0.025 (d)	B	2.50E-02
2-Methylphenol	95-48-7	NA	0.35	B	3.50E-01
2-Nitroaniline	88-74-4	NA	2.2	C (nc)	2.20E+00
2-Nitrophenol	88-75-5	NA	2.3 (h)	C (nc)	2.30E+00
3,3'-Dichlorobenzidine	91-94-1	0.000077	0.02	A	7.70E-05
3-Nitroaniline	99-09-2	NA	0.0022 (i)	C (nc)	2.20E-03

TABLE 2
DATA QUALITY LIMITS (DQLs) FOR SURFACE WATER AND GROUNDWATER
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

CONSTITUENT	CAS NO.	Surface Water (m) DQL (mg/L)		Ground Water (a) DQL (mg/L)		Ground Water (a) Basis	Selected DQL (p) (mg/L)
4,6-Dinitro-2-methylphenol	534-52-1	0.765		NA		E	7.65E-01
4-Bromophenyl phenyl ether	101-55-3	NA		NA		E	NA
4-Chloraniline	106-47-8	NA		0.028		B	2.80E-02
4-Chloro-3-methylphenol	59-50-7	NA		NA		E	NA
4-Chlorophenol phenyl ether	7005-72-3	NA		NA		E	NA
4-Methylphenol	106-44-5	NA		0.35		B	3.50E-01
4-Nitroaniline	100-01-6	NA		0.0022	(i)	C (nc)	2.20E-03
4-Nitrophenol	100-02-7	NA		2.3		C (nc)	2.30E+00
Acenaphthene	83-32-9	2.7		0.42		B	4.20E-01
Acenaphthylene	208-96-8	2.7	(b)	0.42	(b)	B	4.20E-01
Anthracene	120-12-7	110		2.1		B	2.10E+00
Benz[a]anthracene	56-55-3	0.000049		0.00013		B	4.90E-05
Benzo[a]pyrene	50-32-8	0.000049		0.00023		A	4.90E-05
Benzo[b]fluoranthene	205-99-2	0.000049		0.00018		B	4.90E-05
Benzo[g,h,i]perylene	191-24-2	NA		0.21	(e)	B	2.10E-01
Benzo[k]fluoranthene	207-08-9	0.000049		0.00017		B	4.90E-05
bis(2-Chloroethoxy)methane	111-91-1	NA		NA		E	NA
bis(2-Chloroethyl)ether	111-44-4	0.0014		0.01		A	1.40E-03
bis(2-Ethylhexyl)phthalate	117-81-7	0.0059		0.006		B	5.90E-03
Butyl benzyl phthalate	85-68-7	5.2		1.4		B	1.40E+00
Carbazole	86-74-8	NA		0.0034		C (ca)	3.40E-03
Chrysene	218-01-9	0.000049		0.0015		B	4.90E-05
Dibenz[a,h]anthracene	53-70-3	0.000049		0.0003		A	4.90E-05
Dibenzofuran	132-64-9	NA		0.024		C (nc)	2.40E-02
Diethylphthalate	84-66-2	120		5.6		B	5.60E+00
Dimethyl phthalate	131-11-3	2900		370		C (nc)	3.70E+02
Di-n-butyl phthalate	84-74-2	12		0.7		B	7.00E-01
Di-n-octyl phthalate	117-84-0	NA		0.14		B	1.40E-01
Fluoranthene	206-44-0	0.37		0.28		B	2.80E-01
Fluorene	86-73-7	14		0.28		B	2.80E-01
Hexachlorobenzene	118-74-1	0.00000077		0.00006		A	7.70E-07
Hexachlorobutadiene	87-68-3	0.05		0.00086		C (ca)	8.60E-04
Hexachlorocyclopentadiene	77-47-4	17		0.05		B	5.00E-02
Hexachloroethane	67-72-1	0.0089		0.007		B	7.00E-03
Indeno[1,2,3-cd]pyrene	193-39-5	0.000049		0.00043		B	4.90E-05
Isophorone	78-59-1	2.6		1.4		B	1.40E+00
Naphthalene	91-20-3	NA		0.025		B	2.50E-02
Nitrobenzene	98-95-3	1.9		0.0035		B	3.50E-03
N-Nitroso-di-n-propylamine	621-64-7	0.0014		0.01		A	1.40E-03
N-Nitrosodiphenylamine	86-30-6	0.016		0.01		B	1.00E-02
Pentachlorophenol	87-86-5	0.0082		0.001		A	1.00E-03
Phenanthrene	85-01-8	110	(f)	2.1	(f)	B	2.10E+00
Phenol	108-95-2	4600		0.1		B	1.00E-01
Pyrene	129-00-0	11		0.21		B	2.10E-01

TABLE 2
DATA QUALITY LIMITS (DQLs) FOR SURFACE WATER AND GROUNDWATER
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

CONSTITUENT	CAS NO.	Surface Water (m) DQL (mg/L)		Ground Water (a) DQL (mg/L)		Ground Water (a) Basis	Selected DQL (p) (mg/L)
TAL Metals							
Aluminum	7429-90-5	NA		37		C (nc)	3.70E+01
Antimony	7440-36-0	4.3		0.006		B	6.00E-03
Arsenic	7440-38-2	0.00014		0.001		A	1.40E-04
Barium	7440-39-3	NA		2		B	2.00E+00
Beryllium	7440-41-7	NA		0.004		A	4.00E-03
Cadmium	7440-43-9	NA		0.005		B	5.00E-03
Calcium	7440-70-2	NA		NA		F	NA
Chromium	7440-47-3	NA		0.1		B	1.00E-01
Cobalt	7440-48-4	NA		1		B	1.00E+00
Iron	7439-89-6	NA		5		B	5.00E+00
Lead	7439-92-1	NA		0.0075		B	7.50E-03
Magnesium	7439-95-4	NA		NA		F	NA
Manganese	7439-96-5	0.1		0.15		B	1.00E-01
Nickel	7440-02-0	4.6		0.1		B	1.00E-01
Potassium	7440-09-7	NA		NA		F	NA
Selenium	7782-49-2	11		0.05		B	5.00E-02
Silver	7440-22-4	NA		0.05		B	5.00E-02
Sodium	7440-23-5	NA		NA		F	NA
Thallium	7440-28-0	0.0063		0.002		B	2.00E-03
Vanadium	7440-62-2	NA		0.049		B	4.90E-02
Mercury	7439-97-6	0.000051		0.002		B	5.10E-05
Copper	7440-50-8	NA		0.65		B	6.50E-01
Zinc	7440-66-6	69		5		B	5.00E+00
Cyanide	57-12-5	220		0.2		B	2.00E-01
Pesticides							
Alpha-BHC	319-84-6	0.000013		0.00003		A	1.30E-05
Beta-BHC	319-85-7	0.000046		0.00003	(n)	A	3.00E-05
Delta-BHC	319-86-8	NA		0.00003	(n)	A	3.00E-05
Gamma-BHC (Lindane)	58-89-9	0.000063		0.0002		B	6.30E-05
Aldrin	309-00-2	0.00000014		0.00004		A	1.40E-07
alpha-Chlordane	5103-71-9	0.0000022	(j)	0.00014	(j)	A	2.20E-06
gamma-Chlordane	5103-74-2	0.0000022	(j)	0.00014	(j)	A	2.20E-06
Chlordane	57-74-9	0.0000022		0.00014		A	2.20E-06
Chlorobenzilate	510-15-6	NA		0.00025		C (ca)	2.50E-04
1,2-Dibromo-3-Chloropropane (DBCP)	96-12-8	NA		0.002		A	2.00E-03
4,4'-DDD	72-54-8	0.00000084		0.00011		B	8.40E-07
4,4'-DDE	72-55-9	0.00000059		0.00004		B	5.90E-07
4,4'-DDT	50-29-3	0.00000059		0.00012		B	5.90E-07
Diallate	2303-16-4	NA		0.0011		C (ca)	1.10E-03
Dieldrin	60-57-1	0.00000014		0.00002		A	1.40E-07
Endosulfan I	959-98-8	0.24		0.042	(k)	B	4.20E-02
Endosulfan II	33213-65-9	0.24		0.042	(k)	B	4.20E-02
Endosulfan sulfate	1031-07-8	0.24		0.042	(k)	B	4.20E-02
Endrin	72-20-8	0.00081		0.002		B	8.10E-04
Endrin aldehyde	7421-93-4	0.00081		0.002	(l)	B	8.10E-04
Endrin Ketone	53494-70-5	0.00081	(l)	0.002	(l)	B	8.10E-04
Heptachlor	76-44-8	0.00000021		0.00003		A	2.10E-07
Heptachlor epoxide	1024-57-3	0.00000011		0.00032		A	1.10E-07
Hexachlorobenzene	118-74-1	0.00000077		0.00006		A	7.70E-07
Hexachlorocyclopentadiene	77-47-4	17		0.05		B	5.00E-02
Isodrin	465-73-6	NA		NA		E	NA
Methoxychlor	72-43-5	NA		0.04		B	4.00E-02
Toxaphene	8001-35-2	0.00000075		0.00086		A	7.50E-07

TABLE 2
DATA QUALITY LIMITS (DQLs) FOR SURFACE WATER AND GROUNDWATER
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

CONSTITUENT	CAS NO.	Surface Water (m) DQL (mg/L)	Ground Water (a) DQL (mg/L)		Ground Water (a) Basis	Selected DQL (p) (mg/L)
Herbicides						
2,4-D	94-75-7	NA	0.07		B	7.00E-02
2,4-DB	94-82-6	NA	2.92E+02	(o)	C (nc)	2.92E+02
2,4,5-TP	93-72-1	NA	0.05		B	5.00E-02
2,4,5-T	93-76-5	NA	7.82E+02	(o)	C (nc)	7.82E+02
Dalapon	75-99-0	NA	0.2		B	2.00E-01
Dicamba	1918-00-9	NA	1.1		C (nc)	1.10E+00
Dichloroprop	120-36-5	NA	NA		E	NA
Dinoseb	88-85-7	NA	0.007		B	7.00E-03
MCPA	94-74-6	NA	1.83E+01	(o)	C (nc)	1.83E+01
MCPP	93-65-2	NA	3.65E+01	(o)	C (nc)	3.65E+01
4-Nitrophenol	100-02-7	NA	2.3		C (nc)	2.30E+00
Pentachlorophenol	87-86-5	0.0082	0.001		A	1.00E-03
Dioxins and Furans						
2,3,7,8-TCDD	1746-01-6	1.40E-11	4.50E-07		C	1.40E-11
1,2,3,7,8-PentaCDD	40321-76-4	1.40E-11	4.50E-07		C	1.40E-11
1,2,3,4,7,8-HexaCDD	39227-28-6	1.40E-11	4.50E-07		C	1.40E-11
1,2,3,6,7,8-HexaCDD	57653-85-7	1.40E-11	4.50E-07		C	1.40E-11
1,2,3,7,8,9-HexaCDD	19408-74-3	1.40E-11	4.50E-07		C	1.40E-11
1,2,3,4,6,7,8-HeptaCDD	35822-39-4	1.40E-11	4.50E-07		C	1.40E-11
OctaCDD	3268-87-9	1.40E-11	4.50E-07		C	1.40E-11
2,3,7,8-TetraCDF	51207-31-9	1.40E-11	4.50E-07		C	1.40E-11
1,2,3,7,8-PentaCDF	57117-41-6	1.40E-11	4.50E-07		C	1.40E-11
2,3,4,7,8-PentaCDF	57117-31-4	1.40E-11	4.50E-07		C	1.40E-11
1,2,3,4,7,8-HexaCDF	70648-26-9	1.40E-11	4.50E-07		C	1.40E-11
1,2,3,6,7,8-HexaCDF	57117-44-9	1.40E-11	4.50E-07		C	1.40E-11
1,2,3,7,8,9-HexaCDF	72918-21-9	1.40E-11	4.50E-07		C	1.40E-11
2,3,4,6,7,8-HexaCDF	60851-34-5	1.40E-11	4.50E-07		C	1.40E-11
1,2,3,4,6,7,8-HeptaCDF	67562-39-4	1.40E-11	4.50E-07		C	1.40E-11
1,2,3,4,7,8,9-HeptaCDF	55673-89-7	1.40E-11	4.50E-07		C	1.40E-11
OctaCDF	39001-02-0	1.40E-11	4.50E-07		C	1.40E-11

TABLE 2
DATA QUALITY LIMITS (DQLs) FOR SURFACE WATER AND GROUNDWATER
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

CONSTITUENT	CAS NO.	Surface Water (m) DQL (mg/L)	Ground Water (a) DQL (mg/L)	Ground Water (a) Basis	Selected DQL (p) (mg/L)
Additional (added 4/17/99)					
Copper, method 7211	7440-50-8	NA	6.50E-01	B	6.50E-01
Zinc, method 7151	7440-66-6	6.90E+01	5.00E+00	B	5.00E+00
TOC, method 9060	NA	NA	NA	E	NA
Hardness, method 130.1	NA	NA	NA	E	NA
TPH, method 8015B	NA	NA	NA	E	NA
Residue, dissolved	NA	NA	NA	E	NA
Residue, suspended	NA	NA	NA	E	NA
Total PCBs	NA	1.70E-07	5.00E-04	B	1.70E-07
Fluoride	7782-41-4	NA	(q)		NA
Phosphorous	7723-14-0	NA	(q)		NA
Ortho-phosphate	NA	NA	(q)		NA

Notes:
(a) - The following hierarchy was used to determine the appropriate DQL:
1. ADL value from Appendix A Table H from the Illinois Tiered Approach to Corrective Action (TACO) Program.
2. For constituents not on Table H, the value for Class I GW from Appendix B Table E was used.
3. For constituents with no TACO values, the Region IX PRG for tap water was used.
4. For remaining constituents, a default value equivalent to the lowest DQL for that type of constituent was used.
(b) Due to structural similarities, the value for Acenaphthene was used.
(c) Value for cis-1,2-Dichloroethylene.
(d) Due to structural similarities, the value for Naphthalene was used.
(e) Due to structural similarities, the value for Pyrene was used.
(f) Due to structural similarities, the value for Anthracene was used.
(g) Due to structural similarities, the value for 4-Methyl-2-Pentanone was used.
(h) Due to structural similarities, the value for 4-Nitrophenol was used.
(i) Due to structural similarities, the value for 2-Nitroaniline was used.
(j) Due to structural similarities, the value for Chlordane was used.
(k) Due to structural similarities, the value for Endosulfan was used.
(l) Due to structural similarities, the value for Endrin was used.
(m) Surface Water Values were obtained from Federal Register, Vol. 63, No. 237. Value for Human Health Consumption of Organisms.
(n) Due to structural similarities, the value for alpha-BHC was used.
(o) PRG calculated based on equations in PRG table.
(p) - Selected DQL is the lower of the surface water and groundwater DQLs.
(q) - Constituent will not be analyzed for in groundwater.
nc - Based on noncarcinogenic effects.
ca - Based on carcinogenic effects.
CAS = Chemical Abstracts Service.
CB = Chlorobiphenyl.
CDD = Chlorodibenzodioxin.
CDF = Chlorodibenzofuran.
DQL = Data Quality Limit.
NA = Not available.
PCB = Polychlorinated Biphenyl.
PRG = USEPA Region 9 Preliminary Remediation Goal (USEPA, 1998c).
TAL = Target Analyte List.
TCL = Target Compound List.
A = IEPA, 1998, Appendix A, Table H, Acceptable Detection Limit (ADL) Value.
B = IEPA, 1998, Appendix B, Table E, Value for Class I Groundwater.
C = Region IX PRG.
D = Default Value based on lowest DQL.
E = No toxicity information is available for this constituent therefore DQL was not developed.
F = No value is available as this constituent is an essential nutrient.

TABLE 3
DATA QUALITY LIMITS (DQLs) FOR FISH TISSUE
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

CONSTITUENT	CAS NO.	DQL (mg/kg)	(n)	Basis
TCL Semi-Volatiles				
1,2,4-Trichlorobenzene	120-82-1	14		N
1,2-Dichlorobenzene	95-50-1	120		N
1,3-Dichlorobenzene	541-73-1	41		N
1,4-Dichlorobenzene	106-46-7	0.13		C
2,2'-oxybis(1-Chloropropane)	108-60-1	0.045	(m)	C
2,4,5-Trichlorophenol	95-95-4	140		N
2,4,6-Trichlorophenol	88-06-2	0.29		C
2,4-Dichlorophenol	120-83-2	4.1		N
2,4-Dimethylphenol	105-67-9	27		N
2,4-Dinitrophenol	51-28-5	2.7		N
2,4-Dinitrotoluene	121-14-2	2.7		N
2,6-Dinitrotoluene	606-20-2	1.4		N
2-Chloronaphthalene	91-58-7	110		N
2-Chlorophenol	95-57-8	6.8		N
2-Methylnaphthalene	91-57-6	27		N
2-Methylphenol	95-48-7	68		N
2-Nitroaniline	88-74-4	NA		O
2-Nitrophenol	88-75-5	11	(a)	N
3,3'-Dichlorobenzidine	91-94-1	0.007		C
3-Nitroaniline	99-09-2	NA		O
4,6-Dinitro-2-methylphenol	534-52-1	NA		D
4-Bromophenyl phenyl ether	101-55-3	NA		D
4-Chloraniline	106-47-8	5.4		N
4-Chloro-3-methylphenol	59-50-7	NA		D
4-Chlorophenol phenyl ether	7005-72-3	NA		D
4-Methylphenol	106-44-5	6.8		N
4-Nitroaniline	100-01-6	NA		O
4-Nitrophenol	100-02-7	11		N
Acenaphthene	83-32-9	81		N
Acenaphthylene	208-96-8	81	(b)	N
Anthracene	120-12-7	410		N
Benz[a]anthracene	56-55-3	0.0043		C
Benzo[a]pyrene	50-32-8	0.00043		C
Benzo[b]fluoranthene	205-99-2	0.0043		C
Benzo[g,h,i]perylene	191-24-2	41	(c)	N
Benzo[k]fluoranthene	207-08-9	0.043		C
bis(2-Chloroethoxy)methane	111-91-1	NA		D
bis(2-Chloroethyl)ether	111-44-4	0.0029		C
bis(2-Ethylhexyl)phthalate	117-81-7	0.23		C
Butyl benzyl phthalate	85-68-7	270		N
Carbazole	86-74-8	0.16		C
Chrysene	218-01-9	0.43		C
Dibenz[a,h]anthracene	53-70-3	0.00043		C
Dibenzofuran	132-64-9	5.4		N
Diethylphthalate	84-66-2	1100		N

TABLE 3
DATA QUALITY LIMITS (DQLs) FOR FISH TISSUE
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

CONSTITUENT	CAS NO.	DQL (mg/kg)	(n)	Basis
Dimethyl phthalate	131-11-3	14000		N
Di-n-butyl phthalate	84-74-2	140		N
Di-n-octyl phthalate	117-84-0	27		N
Fluoranthene	206-44-0	54		N
Fluorene	86-73-7	54		N
Hexachlorobenzene	118-74-1	0.002		C
Hexachlorobutadiene	87-68-3	0.04		C
Hexachlorocyclopentadiene	77-47-4	9.5		N
Hexachloroethane	67-72-1	0.23		C
Indeno[1,2,3-cd]pyrene	193-39-5	0.0043		C
Isophorone	78-59-1	3.3		C
Naphthalene	91-20-3	27		N
Nitrobenzene	98-95-3	0.68		N
N-Nitroso-di-n-propylamine	621-64-7	0.00045		C
N-Nitrosodiphenylamine	86-30-6	0.64		C
Pentachlorophenol	87-86-5	0.026		C
Phenanthrene	85-01-8	410	(d)	N
Phenol	108-95-2	810		N
Pyrene	129-00-0	41		N
TAL Metals				
Aluminum	7429-90-5	1400		N
Antimony	7440-36-0	0.54		N
Arsenic	7440-38-2	0.0021		C
Barium	7440-39-3	95		N
Beryllium	7440-41-7	2.7		N
Cadmium	7440-43-9	1.4	(f)	N
Calcium	7440-70-2	NA		B
Chromium	7440-47-3	4.1	(g)	N
Cobalt	7440-48-4	81		N
Iron	7439-89-6	410		N
Lead	7439-92-1	NA		O
Magnesium	7439-95-4	NA		B
Manganese	7439-96-5	190	(h)	N
Nickel	7440-02-0	27		N
Potassium	7440-09-7	NA		B
Selenium	7782-49-2	6.8		N
Silver	7440-22-4	6.8		N
Sodium	7440-23-5	NA		B
Thallium	7440-28-0	0.095		N
Vanadium	7440-62-2	9.5		N
Mercury	7439-97-6	0.14	(e)	N
Copper	7440-50-8	54		N
Zinc	7440-66-6	410		N
Cyanide	57-12-5	27		N

TABLE 3
DATA QUALITY LIMITS (DQLs) FOR FISH TISSUE
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

CONSTITUENT	CAS NO.	DQL (mg/kg) (n)	Basis
PCBs			
Total PCBs	NA	0.0016	C
Pesticides			
Alpha-BHC	319-84-6	0.0005	C
Beta-BHC	319-85-7	0.0018	C
Delta-BHC	319-86-8	0.0018 (i)	C
Gamma-BHC (Lindane)	58-89-9	0.0024	C
Aldrin	309-00-2	0.00019	C
alpha-Chlordane	5103-71-9	0.009 (j)	C
gamma-Chlordane	5103-74-2	0.009 (j)	C
Chlordane	57-74-9	0.009	C
Chlorobenzilate	510-15-6	0.012	C
1,2-Dibromo-3-Chloropropane (DBCP)	96-12-8	0.0023	C
4,4'-DDD	72-54-8	0.013	C
4,4'-DDE	72-55-9	0.0093	C
4,4'-DDT	50-29-3	0.0093	C
Diallate	2303-16-4	NA	O
Dieldrin	60-57-1	0.0002	C
Endosulfan I	959-98-8	8.1 (k)	N
Endosulfan II	33213-65-9	8.1 (k)	N
Endosulfan sulfate	1031-07-8	8.1 (k)	N
Endrin	72-20-8	0.41	N
Endrin aldehyde	7421-93-4	0.41 (l)	N
Endrin Ketone	53494-70-5	0.41 (l)	N
Heptachlor	76-44-8	0.0007	C
Heptachlor epoxide	1024-57-3	0.00035	C
Hexachlorobenzene	118-74-1	0.002	C
Hexachlorocyclopentadiene	77-47-4	9.5	N
Isodrin	465-73-6	NA	D
Methoxychlor	72-43-5	6.8	N
Toxaphene	8001-35-2	0.0029	C
Herbicides			
2,4-D	94-75-7	14	N
2,4-DB	94-82-6	NA	O
2,4,5-TP	93-72-1	NA	O
2,4,5-T	93-76-5	14	N
Dalapon	75-99-0	41	N
Dicamba	1918-00-9	41	N
Dichloroprop	120-36-5	NA	O
Dinoseb	88-85-7	1.4	N
MCPA	94-74-6	NA	O
MCPP	93-65-2	NA	O
4-Nitrophenol	100-02-7	11	N
Pentachlorophenol	87-86-5	0.026	C

TABLE 3
DATA QUALITY LIMITS (DQLs) FOR FISH TISSUE
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

CONSTITUENT	CAS NO.	DQL (mg/kg) (n)	Basis
Dioxins and Furans			
2,3,7,8-TCDD	1746-01-6	2.10E-08	C
1,2,3,7,8-PentaCDD	40321-76-4	2.10E-08	C
1,2,3,4,7,8-HexaCDD	39227-28-6	2.10E-08	C
1,2,3,6,7,8-HexaCDD	57653-85-7	2.10E-08	C
1,2,3,7,8,9-HexaCDD	19408-74-3	2.10E-08	C
1,2,3,4,6,7,8-HeptaCDD	35822-39-4	2.10E-08	C
OctaCDD	3268-87-9	2.10E-08	C
2,3,7,8-TetraCDF	51207-31-9	2.10E-08	C
1,2,3,7,8-PentaCDF	57117-41-6	2.10E-08	C
2,3,4,7,8-PentaCDF	57117-31-4	2.10E-08	C
1,2,3,4,7,8-HexaCDF	70648-26-9	2.10E-08	C
1,2,3,6,7,8-HexaCDF	57117-44-9	2.10E-08	C
1,2,3,7,8,9-HexaCDF	72918-21-9	2.10E-08	C

TABLE 3
DATA QUALITY LIMITS (DQLs) FOR FISH TISSUE
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

CONSTITUENT	CAS NO.	DQL (mg/kg) (n)	Basis
2,3,4,6,7,8-HexaCDF	60851-34-5	2.10E-08	C
1,2,3,4,6,7,8-HeptaCDF	67562-39-4	2.10E-08	C
1,2,3,4,7,8,9-HeptaCDF	55673-89-7	2.10E-08	C
OctaCDF	39001-02-0	2.10E-08	C

Notes:
B = No value is available as this constituent is an essential nutrient.
C = USEPA, 1998e, Based on carcinogenic USEPA Region 3 RBC value.
D = No toxicological value available, therefore, no DQL was developed.
N = USEPA, 1998e, Based on non-carcinogenic USEPA Region 3 RBC value.
O = No RBC available; therefore, no DQL developed.
CAS = Chemical Abstracts Service.
CB = Chlorobiphenyl.
CDD = Chlorodibenzodioxin.
CDF = Chlorodibenzofuran.
DQL = Data Quality Limit.
NA = Not Available.
PCB = Polychlorinated Biphenyl.
PRG = USEPA Region 9 Preliminary Remediation Goal (USEPA, 1998c).
RBC = USEPA Region 3 Risk Based Concentration (USEPA, 1998e).
TAL = Target Analyte List.
TCL = Target Compound List.
(a) Due to structural similarities, the value for 4-Nitrophenol was used.
(b) Due to structural similarities, the value for Acenaphthene was used.
(c) Due to structural similarities, the value for Pyrene was used.
(d) Due to structural similarities, the value for Anthracene was used.
(e) Value for Methyl Mercury.
(f) Value for Cadmium-food.
(g) Value for Chromium IV.
(h) Value for Manganese-food.
(i) Due to structural similarities, the value for Beta BHC was used.
(j) Due to structural similarities, the value for Chlordane was used.
(k) Due to structural similarities, the value for Endosulfan was used.
(l) Due to structural similarities, the value for Endrin was used.
(m) Due to structural similarities, the value for Bis(2-Chloroisopropyl) ether was used.
(n) DQLs for Fish Tissue based on USEPA Region 3 RBCs (USEPA, 1998e).

TABLE 4
DATA QUALITY LIMITS (DQLs) FOR AIR
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

CONSTITUENT	CAS NO.	DQL (ug/m^3) (a)	Basis
TCL Volatiles			
1,1,1-Trichloroethane	71-55-6	1000	A
1,1,2,2-Tetrachloroethane	79-34-5	0.033	B
1,1,2-Trichloroethane	79-00-5	0.12	B
1,1-Dichloroethane	75-34-3	520	A
1,1-Dichloroethylene	75-35-4	0.038	B
1,2-Dichloroethane	107-06-2	0.074	B
1,2-Dichloroethylene (total)	540-59-0	37 (c)	A
1,2-Dichloropropane	78-87-5	0.099	B
2-Butanone	78-93-3	1000	A
2-Hexanone	591-78-6	83 (d)	A
4-Methyl-2-pentanone	108-10-1	83	A
Acetone	67-64-1	370	A
Benzene	71-43-2	0.23	B
Bromodichloromethane	75-27-4	0.11	B
Bromoform	75-25-2	1.7	B
Bromomethane	74-83-9	5.2	A
Carbon Disulfide	75-15-0	730	A
Carbon tetrachloride	56-23-5	0.13	B
Chlorobenzene	108-90-7	21	A
Chloroethane	75-00-3	NA	D
Chloroform	67-66-3	0.084	B
Chloromethane	74-87-3	1.1	B
cis-1,3-Dichloropropene	10061-01-5	0.052 (e)	B
Dibromochloromethane	124-48-1	0.08	B
Ethyl Benzene	100-41-4	1100	A
Methylene chloride	75-09-2	4.1	B
Styrene	100-42-5	1100	A
Tetrachloroethene	127-18-4	3.3	B
Toluene	108-88-3	400	A
Total Xylenes	1330-20-7	730	A
trans-1,3-Dichloropropene	10061-02-6	0.052 (e)	B
Trichloroethene	79-01-6	1.1	B
Vinyl chloride	75-01-4	0.022	B
TCL Semi-Volatiles			
1,2,4-Trichlorobenzene	120-82-1	210	A
1,2-Dichlorobenzene	95-50-1	210	A
1,3-Dichlorobenzene	541-73-1	8.4	A
1,4-Dichlorobenzene	106-46-7	0.28	B
2,2'-oxybis(1-Chloropropane)	108-60-1	0.19 (b)	B
2,4,5-Trichlorophenol	95-95-4	370	A
2,4,6-Trichlorophenol	88-06-2	0.62	B
2,4-Dichlorophenol	120-83-2	11	A
2,4-Dimethylphenol	105-67-9	73	A
2,4-Dinitrophenol	51-28-5	7.3	A
2,4-Dinitrotoluene	121-14-2	7.3	A
2,6-Dinitrotoluene	606-20-2	3.7	A
2-Chloronaphthalene	91-58-7	290	A
2-Chlorophenol	95-57-8	18	A

TABLE 4
DATA QUALITY LIMITS (DQLs) FOR AIR
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

CONSTITUENT	CAS NO.	DQL (ug/m^3) (a)		Basis
2-Methylnaphthalene	91-57-6	3.1	(f)	A
2-Methylphenol	95-48-7	180		A
2-Nitroaniline	88-74-4	0.21		A
2-Nitrophenol	88-75-5	230	(g)	A
3,3'-Dichlorobenzidine	91-94-1	0.015		B
3-Nitroaniline	99-09-2	0.21	(h)	A
4,6-Dinitro-2-methylphenol	534-52-1	NA		C
4-Bromophenyl phenyl ether	101-55-3	NA		C
4-Chloraniline	106-47-8	15		A
4-Chloro-3-methylphenol	59-50-7	NA		C
4-Chlorophenol phenyl ether	7005-72-3	NA		C
4-Methylphenol	106-44-5	18		A
4-Nitroaniline	100-01-6	0.21	(h)	A
4-Nitrophenol	100-02-7	230		A
Acenaphthene	83-32-9	220		A
Acenaphthylene	208-96-8	220	(i)	A
Anthracene	120-12-7	1100		A
Benz[a]anthracene	56-55-3	0.022		B
Benzo[a]pyrene	50-32-8	0.0022		B
Benzo[b]fluoranthene	205-99-2	0.022		B
Benzo[g,h,i]perylene	191-24-2	110	(j)	A
Benzo[k]fluoranthene	207-08-9	0.22		B
bis(2-Chloroethoxy)methane	111-91-1	NA		C
bis(2-Chloroethyl)ether	111-44-4	0.0058		B
bis(2-Ethylhexyl)phthalate	117-81-7	0.48		B
Butyl benzyl phthalate	85-68-7	730		A
Carbazole	86-74-8	0.34		B
Chrysene	218-01-9	2.2		B
Dibenz[a,h]anthracene	53-70-3	0.0022		B
Dibenzofuran	132-64-9	15		A
Diethylphthalate	84-66-2	2900		A
Dimethyl phthalate	131-11-3	37000		B
Di-n-butyl phthalate	84-74-2	370		A
Di-n-octyl phthalate	117-84-0	73		A
Fluoranthene	206-44-0	150		A
Fluorene	86-73-7	150		A
Hexachlorobenzene	118-74-1	0.0042		B
Hexachlorobutadiene	87-68-3	0.087		B
Hexachlorocyclopentadiene	77-47-4	0.073		A
Hexachloroethane	67-72-1	0.48		B
Indeno[1,2,3-cd]pyrene	193-39-5	0.022		B
Isophorone	78-59-1	7.1		B
Naphthalene	91-20-3	3.1		A
Nitrobenzene	98-95-3	2.1		A
N-Nitroso-di-n-propylamine	621-64-7	0.00096		B
N-Nitrosodiphenylamine	86-30-6	1.4		B
Pentachlorophenol	87-86-5	0.056		B
Phenanthrene	85-01-8	1100	(k)	A
Phenol	108-95-2	2200		A
Pyrene	129-00-0	110		A

TABLE 4
DATA QUALITY LIMITS (DQLs) FOR AIR
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

CONSTITUENT	CAS NO.	DQL (ug/m^3) (a)	Basis
TAL Metals			
Aluminum	7429-90-5	NA	
Antimony	7440-36-0	NA	
Arsenic	7440-38-2	0.00045	B
Barium	7440-39-3	0.52	A
Beryllium	7440-41-7	0.0008	B
Cadmium	7440-43-9	0.0011	B
Calcium	7440-70-2	NA	
Chromium	7440-47-3	0.000023 (l)	B
Cobalt	7440-48-4	0.021	A
Iron	7439-89-6	NA	
Lead	7439-92-1	NA	
Magnesium	7439-95-4	NA	
Manganese	7439-96-5	0.051	A
Nickel	7440-02-0	0.008 (m)	B
Potassium	7440-09-7	NA	
Selenium	7782-49-2	NA	
Silver	7440-22-4	NA	
Sodium	7440-23-5	NA	
Thallium	7440-28-0	NA	
Vanadium	7440-62-2	NA	
Mercury	7439-97-6	0.31	A
Copper	7440-50-8	NA	
Zinc	7440-66-6	NA	
Cyanide	57-12-5	NA	
PCBs			
Total PCBs	NA	0.0034	B

TABLE 4
DATA QUALITY LIMITS (DQLs) FOR AIR
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

CONSTITUENT	CAS NO.	DQL (ug/m^3) (a)	Basis
Dioxins and Furans			
2,3,7,8-TCDD	1746-01-6	4.50E-08	B
1,2,3,7,8-PentaCDD	40321-76-4	4.50E-08	B
1,2,3,4,7,8-HexaCDD	39227-28-6	4.50E-08	B
1,2,3,6,7,8-HexaCDD	57653-85-7	4.50E-08	B
1,2,3,7,8,9-HexaCDD	19408-74-3	4.50E-08	B
1,2,3,4,6,7,8-HeptaCDD	35822-39-4	4.50E-08	B
OctaCDD	3268-87-9	4.50E-08	B
2,3,7,8-TetraCDF	51207-31-9	4.50E-08	B
1,2,3,7,8-PentaCDF	57117-41-6	4.50E-08	B
2,3,4,7,8-PentaCDF	57117-31-4	4.50E-08	B
1,2,3,4,7,8-HexaCDF	70648-26-9	4.50E-08	B
1,2,3,6,7,8-HexaCDF	57117-44-9	4.50E-08	B
1,2,3,7,8,9-HexaCDF	72918-21-9	4.50E-08	B
2,3,4,6,7,8-HexaCDF	60851-34-5	4.50E-08	B
1,2,3,4,6,7,8-HeptaCDF	67562-39-4	4.50E-08	B
1,2,3,4,7,8,9-HeptaCDF	55673-89-7	4.50E-08	B
OctaCDF	39001-02-0	4.50E-08	B
Additional (added 4/17/99)			
Benzyl Alcohol	100-51-6	1.1E+03	A
Bis(2-chloroisopropyl)ether (2,2'-oxybi	108-60-1	1.9E-01 (b)	B
Dichlorodifluoromethane	75-71-8	2.1E+02	A
Trichlorofluoromethane	75-69-4	7.3E+02	A
1,1-Dichloroethene	75-35-4	3.8E-02	B
Trans-1,2-dichloroethene	156-60-5	7.3E+01	A
2,2-Dichloropropane	594-20-7	NA	C
Cis-1,2-dichloroethene	156-59-2	3.7E+01	A
Bromochloromethane	74-97-5	NA	C
1,1-Dichloropropylene	563-58-6	NA	C
Dibromomethane	74-95-3	3.7E+01	A
1,3-Dichloropropane	142-28-9	NA	C
1,2-Dibromomethane	106-93-4	8.7E-03	B
1,1,1,2-Tetrachloroethane	630-20-6	2.6E-01	B
M & p xylenes	108-38-3	7.3E+02	A
o-xylene	95-47-6	7.3E+02	A
isopropylbenzene	104-5-18	3.7E+01	A
1,2,3,-trichloropropane	96-18-4	9.6E-04	B
n-proplybenzene	104-51-8	3.7E+01	A
Bromobenzene	108-86-1	1.0E+01	A
1,3,5-Trimethylbenzene	108-67-8	6.2E+00	A
2-Chlorotoluene	95-49-8	7.3E+01	A
4-Chlorotoluene	106-43-4	7.3E+01 (n)	A
t-Butylbenzene	104-5-18	3.7E+01	A
1,2,4-Trimethylbenzene	95-63-6	6.2E+00	A
s-Butylbenzene	135-9-88	3.7E+01	A
p-Isopropyltoluene	99-87-6	NA	C
n-Butylbenzene	104-51-8	3.7E+01	A
1,2-Dibromo-3-chloropropane	96-12-8	2.1E-01	A

TABLE 4
DATA QUALITY LIMITS (DQLs) FOR AIR
SAUGET AREA 1 EE/CA AND RI/FS
SAUGET AND CAHOKIA, ILLINOIS
SOLUTIA, INC.

CONSTITUENT	CAS NO.	DQL (ug/m^3) (a)	Basis
1,2,3-Trichlorobenzene	87-61-6	NA	C
Vinyl acetate	108-05-4	2.1E+02	A

Notes:
CAS = Chemical Abstracts Service.
CB = Chlorobiphenyl.
CDD = Chlorodibenzodioxin.
CDF = Chlorodibenzofuran.
DQL = Data Quality Limit.
NA = Not available.
PCB = Polychlorinated Biphenyl.
PRG = Preliminary Remedial Goal.
TAL = Target Analyte List.
TCL = Target Compound List.
(a) Air DQLs are based on USEPA Region IX PRG Table. (USEPA, 1998c)
(b) Synonym of Bis(2-Chloroisopropyl ether)
(c) Value for cis-1,2-Dichloroethylene used.
(d) Due to structural similarities, the value for 4-Methyl-2-Pentanone was used.
(e) Value for 1,3-Dichloropropene.
(f) Due to structural similarities, the value for Naphthalene was used.
(g) Due to structural similarities, the value for 4-Nitrophenol was used.
(h) Due to structural similarities, the value for 2-Nitroaniline was used.
(i) Due to structural similarities, the value for Acenaphthene was used.
(j) Due to structural similarities, the value for Pyrene was used.
(k) Due to structural similarities, the value for Anthracene was used.
(l) Value for Chromium IV.
(m) Value for Nickel Refinery Dust.
(n) - Due to structural similarities, the value for 2-Chlorotoluene was used.
A = Region IX PRG, based on non-carcinogenic effects.
B = Region IX PRG, based on carcinogenic effects.
C = No Toxicological value available.

APPENDIX B

TACO TIER I CRITERIA

Section 742.APPENDIX B: Tier 1 Tables and Illustrations

Section 742.TABLE A: Tier 1 Soil Remediation Objectives[a] for Residential Properties

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
83-32-9	Acenaphthene	4,700[b]	---[c]	570[b]	2,900	*
67-64-1	Acetone	7,800[b]	100,000[d]	16[b]	16	*
15972-60-8	Alachlor[o]	8[e]	---[c]	0.04	0.2	NA
116-06-3	Aldicarb[o]	78[b]	---[c]	0.013	0.07	NA
309-00-2	Aldrin	0.04[e]	3[e]	0.5[e]	2.5	*
120-12-7	Anthracene	23,000[b]	---[c]	12,000[b]	59,000	*
1912-24-9	Atrazine[o]	2700[b]	---[c]	0.066	0.33	NA
71-43-2	Benzene	22[e]	0.8[e]	0.03	0.17	*
56-55-3	Benzo(*a*)anthracene	0.9[e]	---[c]	2	8	*
205-99-2	Benzo(*b*)fluoranthene	0.9[e]	---[c]	5	25	*

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
207-08-9	Benzo(*k*)fluroanthene	9[e]	---[c]	49	250	*
50-32-8	Benzo(*a*)pyrene	0.09[e,f]	---[c]	8	82	*
111-44-4	Bis(2-chloroethyl)ether	0.6[e]	0.2[e,f]	0.0004[e,f]	0.0004	0.66
117-81-7	Bis(2-ethylhexyl)phthalate	46[e]	31,000[d]	3,600	31,000[d]	*
75-27-4	Bromodichloromethane (Dichlorobromomethane)	10[e]	3,000[d]	0.6	0.6	*
75-25-2	Bromoform	81[e]	53[e]	0.8	0.8	*
71-36-3	Butanol	7,800[b]	10,000[d]	17[b]	17	NA
85-68-7	Butyl benzyl phthalate	16,000[b]	930[d]	930[d]	930[d]	*
86-74-8	Carbazole	32[e]	---[c]	0.6[e]	2.8	NA
1563-66-2	Carbofuran[o]	390[b]	---[c]	0.22	1.1	NA
75-15-0	Carbon disulfide	7,800[b]	720[d]	32[b]	160	*

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
56-23-5	Carbon tetrachloride	5[e]	0.3[e]	0.07	0.33	*
57-74-9	Chlordane	0.5[e]	20[e]	10	48	*
106-47-8	4-Chloroaniline (*p*-Chloroaniline)	310[b]	---[c]	0.7[b]	0.7	1.3
108-90-7	Chlorobenzene (Monochlorobenzene)	1,600[b]	130[b]	1	6.5	*
124-48-1	Chlorodibromomethane (Dibromochloromethane)	1,600[b]	1,300[d]	0.4	0.4	*
67-66-3	Chloroform	100[e]	0.3[e]	0.6	2.9	*
218-01-9	Chrysene	88[e]	---[c]	160	800	*
94-75-7	2,4-D	780[b]	---[c]	1.5	7.7	*
75-99-0	Dalapon	2,300[b]	---[c]	0.85	8.5	1.2
72-54-8	DDD	3[e]	---[c]	16[e]	80	*
72-55-9	DDE	2[e]	---[c]	54[e]	270	*

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
50-29-3	DDT	2[e]	---[g]	32[e]	160	*
53-70-3	Dibenzo(*a,h*)anthracene	0.09[e,f]	---[c]	2	7.6	*
96-12-8	1,2-Dibromo-3-chloropropane	0.46[e]	11[b]	0.002	0.002	*
106-93-4	1,2-Dibromoethane (Ethylene dibromide)	0.0075[e]	0.17[e]	0.0004	0.004	0.005
84-74-2	Di-*n*-butyl phthalate	7,800[b]	2,300[d]	2,300[d]	2,300[d]	*
95-50-1	1,2-Dichlorobenzene (*o* - Dichlorobenzene)	7,000[b]	560[d]	17	43	*
106-46-7	1,4-Dichlorobenzene (*p* - Dichlorobenzene)	---[c]	---[g]	2	11	*
91-94-1	3,3'-Dichlorobenzidine	1[e]	---[c]	0.007[e,f]	0.033	1.3
75-34-3	1,1-Dichloroethane	7,800[b]	1,300[b]	23[b]	110	*

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
107-06-2	1,2-Dichloroethane (Ethylene dichloride)	7[e]	0.4[e]	0.02	0.1	*
75-35-4	1,1-Dichloroethylene	700[b]	1,500[d]	0.06	0.3	*
156-59-2	*cis*-1,2-Dichloroethylene	780[b]	1,200[d]	0.4	1.1	*
156-60-5	*trans*-1,2-Dichloroethylene	1,600[b]	3,100[d]	0.7	3.4	*
78-87-5	1,2-Dichloropropane	9[e]	15[b]	0.03	0.15	*
542-75-6	1,3-Dichloropropene (1,3-Dichloropropylene, *cis* + *trans*)	4[e]	0.1[e]	0.004[e]	0.02	0.005
60-57-1	Dieldrin[n]	0.04[e]	1[e]	0.004[e]	0.02	*
84-66-2	Diethyl phthalate	63,000[b]	2,000[d]	470[b]	470	*
105-67-9	2,4-Dimethylphenol	1,600[b]	---[c]	9[b]	9	*
121-14-2	2,4-Dinitrotoluene	0.9[e]	---[c]	0.0008[e,f]	0.0008	0.013

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
606-20-2	2,6-Dinitrotoluene	0.9[e]	---[c]	0.0007[e,f]	0.0007	0.0067
117-84-0	Di-*n*-octyl phthalate	1,600[b]	10,000[d]	10,000[d]	10,000[d]	*
115-29-7	Endosulfan	470[b]	---[c]	18[b]	90	*
145-73-3	Endothall[o]	1,600[b]	---[c]	0.4	0.4	NA
72-20-8	Endrin	23[b]	---[c]	1	5	*
100-41-4	Ethylbenzene	7,800[b]	400[d]	13	19	*
206-44-0	Fluoranthene	3,100[b]	---[c]	4,300[b]	21,000	*
86-73-7	Fluorene	3,100[b]	---[c]	560[b]	2,800	*
76-44-8	Heptachlor	0.1[e]	0.1[e]	23	110	*
1024-57-3	Heptachlor epoxide	0.07[e]	5[e]	0.7	3.3	*
118-74-1	Hexachlorobenzene	0.4[e]	1[e]	2	11	*
319-84-6	*alpha*-HCH (*alpha*-BHC)	0.1[e]	0.8[e]	0.0005[e,f]	0.003	0.002

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
58-89-9	*gamma*-HCH (Lindane)[n]	0.5[e]	---[c]	0.009	0.047	*
77-47-4	Hexachlorocyclopentadien e	550[b]	10[b]	400	2,200[d]	*
67-72-1	Hexachloroethane	78[b]	---[c]	0.5[b]	2.6	*
193-39-5	Indeno(1,2,3-*c,d*)pyrene	0.9[e]	---[c]	14	69	*
78-59-1	Isophorone	15,600[b]	4,600[d]	8[b]	8	*
72-43-5	Methoxychlor	390[b]	---[c]	160	780	*
74-83-9	Methyl bromide (Bromomethane)	110[b]	10[b]	0.2[b]	1.2	*
75-09-2	Methylene chloride (Dichloromethane)	85[e]	13[e]	0.02[e]	0.2	*
95-48-7	2-Methylphenol (*o* - Cresol)	3,900[b]	---[c]	15[b]	15	*
91-20-3	Naphthalene	3,100[b]	---[c]	84[b]	420	*
98-95-3	Nitrobenzene	39[b]	92[b]	0.1[b,f]	0.1	0.26

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
86-30-6	*N*-Nitrosodiphenylamine	130[f]	---[c]	1[e]	5.6	*
621-64-7	*N*-Nitrosodi-*n*-propylamine	0.09[e,f]	---[c]	0.00005[e,f]	0.00005	0.66
108-95-2	Phenol	47,000[b]	---[c]	100[b]	100	*
1918-02-1	Picloram[o]	5,500[b]	---[c]	2	20	NA
1336-36-3	Polychlorinated biphenyls (PCBs)[n]	1; 10[h]	---[c,h]	---[h]	---[h]	*
129-00-0	Pyrene	2,300[b]	---[c]	4,200[b]	21,000	*
122-34-9	Simazine[o]	390[b]	---[c]	0.04	0.37	NA
100-42-5	Styrene	16,000[b]	1,500[d]	4	18	*
127-18-4	Tetrachloroethylene (Perchloroethylene)	12[e]	11[e]	0.06	0.3	*
108-88-3	Toluene	16,000[b]	650[d]	12	29	*

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
8001-35-2	Toxaphene[n]	0.6[e]	89[e]	31	150	*
120-82-1	1,2,4-Trichlorobenzene	780[b]	3,200[b]	5	53	*
71-55-6	1,1,1-Trichloroethane	---[c]	1,200[d]	2	9.6	*
79-00-5	1,1,2-Trichloroethane	310[b]	1,800[d]	0.02	0.3	*
79-01-6	Trichloroethylene	58[e]	5[e]	0.06	0.3	*
108-05-4	Vinyl acetate	78,000[b]	1,000[b]	170[b]	170	*
75-01-4	Vinyl chloride	0.3[e]	0.03[e]	0.01[f]	0.07	*
108-38-3	m-Xylene	160,000[b]	420[d]	210	210	*
95-47-6	o-Xylene	160,000[b]	410[d]	190	190	*
106-42-3	p-Xylene	160,000[b]	460[d]	200	200	*

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
1330-20-7	Xylenes (total)	160,000[b]	410[d]	150	150	*
	Ionizable Organics					
65-85-0	Benzoic Acid	310,000[b]	---[c]	400[b,i]	400[i]	*
95-57-8	2-Chlorophenol	390[b]	53,000[d]	4[b,i]	4[i]	*
120-83-2	2,4-Dichlorophenol	230[b]	---[c]	1[b,i]	1[i]	*
51-28-5	2,4-Dinitrophenol	160[b]	---[c]	0.2[b,f]	0.2	3.3
88-85-7	Dinoseb[o]	78[b]	---[c]	0.34[b,i]	3.4[i]	*
87-86-5	Pentachlorophenol	3[e,j]	---[c]	0.03[f,i]	0.14[i]	2.4
93-72-1	2,4,5-TP (Silvex)	630[b]	---[c]	11[i]	55[i]	*
95-95-4	2,4,5-Trichlorophenol	7,800[b]	---[c]	270[b,i]	1,400[i]	*
88-06-2	2,4,6 Trichlorophenol	58[e]	200[e]	0.2[e,f,i]	0.77[i]	0.43

		Exposure Route-specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/L)	Class II (mg/L)	ADL (mg/kg)
	Inorganics					
7440-36-0	Antimony	31[b]	---[c]	0.006[m]	0.024[m]	*
7440-38-2	Arsenic[l,n]	0.4[e,t]	750[e]	0.05[m]	0.2[m]	*
7440-39-3	Barium	5,500[b]	690,000[b]	2.0[m]	2.0[m]	*
7440-41-7	Beryllium	0.1[e,t]	1,300[e]	0.004[m]	0.5[m]	*
7440-42-8	Boron	7,000[b]	---[g]	2.0[m]	2.0[m]	*
7440-43-9	Cadmium[l,n]	78[b,r]	1,800[e]	0.005[m]	0.05[m]	*
16887-00-6	Chloride	---[c]	---[c]	200[m]	200[m]	*
7440-47-3	Chromium, total	390[b]	270[e]	0.1[m]	1.0[m]	*
16065-83-1	Chromium, ion, trivalent	78,000[b]	---[c]	---[g]	---[g]	*
18540-29-9	Chromium, ion, hexavalent	390[b]	270[e]	---	---	*
7440-48-4	Cobalt	4,700[b]	---[c]	1.0[m]	1.0[m]	*

		Exposure Route-specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/L)	Class II (mg/L)	ADL (mg/kg)
7440-50-8	Copper[n]	2,900[b]	---[c]	0.65[m]	0.65[m]	*
57-12-5	Cyanide (amenable)	1,600[b]	---[c]	0.2[q]	0.6[q]	*
7782-41-4	Fluoride	4,700[b]	---[c]	4.0[m]	4.0[m]	*
15438-31-0	Iron	---[c]	---[c]	5.0[m]	5.0[m]	*
7439-92-1	Lead	400[k]	---[c]	0.0075[m]	0.1[m]	*
7439-96-5	Manganese	3,700[b]	69,000[b]	0.15[m]	10.0[m]	*
7439-97-6	Mercury[l,n]	23[b,s]	10[b,l]	0.002[m]	0.01[m]	*
7440-02-0	Nickel[l]	1,600[b]	13,000[e]	0.1[m]	2.0[m]	*
14797-55-8	Nitrate as N[p]	130,000[b]	---[c]	10.0[q]	100[q]	*
7782-49-2	Selenium[l,n]	390[b]	---[c]	0.05[m]	0.05[m]	*

		Exposure Route-specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/L)	Class II (mg/L)	ADL (mg/kg)
7440-22-4	Silver	390[b]	---[c]	0.05[m]	---	*
14808-79-8	Sulfate	---[c]	---[c]	400[m]	400[m]	*
7440-28-0	Thallium	6.3[b,u]	---[c]	0.002[m]	0.02[m]	*
7440-62-2	Vanadium	550[b]	---[c]	0.049[m]	---	*
7440-66-6	Zinc[l]	23,000[b]	---[c]	5.0[m]	10[m]	*

"*" indicates that the ADL is less than or equal to the specified remediation objective.
NA means not available; no PQL or EQL available in USEPA analytical methods.

Chemical Name and Soil Remediation Objective Notations

[a] Soil remediation objectives based on human health criteria only.
[b] Calculated values correspond to a target hazard quotient of 1.
[c] No toxicity criteria available for the route of exposure.
[d] Soil saturation concentration ($C_{(sat)}$) = the concentration at which the absorptive limits of the soil particles, the solubility limits of the available soil moisture, and saturation of soil pore air have been reached. Above the soil saturation concentration, the assumptions regarding vapor transport to air and/or dissolved phase transport to groundwater (for chemicals which are liquid at ambient soil temperatures) have been violated, and alternative modeling approaches are required.
[e] Calculated values correspond to a cancer risk level of 1 in 1,000,000.
[f] Level is at or below Contract Laboratory Program required quantitation limit for Regular Analytical Services (RAS).
[g] Chemical-specific properties are such that this route is not of concern at any soil contaminant concentration.
[h] A preliminary goal of 1 ppm has been set for PCBs based on *Guidance on Remedial Actions for Superfund Sites with PCB Contamination*, EPA/540G-90/007, and on USEPA efforts to manage PCB contamination. See 40 CFR 761.120 - USEPA "PCB Spill Cleanup Policy." This regulation goes on to say that the remediation goal for an unrestricted area is 10 ppm and 25 ppm for a restricted area, provided both have at least 10 inches of clean cover.
[i] Soil remediation objective for pH of 6.8. If soil pH is other than 6.8, refer to Appendix B, Tables C and D of this Part.
[j] Ingestion soil remediation objective adjusted by a factor of 0.5 to account for dermal route.
[k] A preliminary remediation goal of 400 mg/kg has been set for lead based on *Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities*, OSWER Directive #9355.4-12.
[l] Potential for soil-plant-human exposure.
[m] The person conducting the remediation has the option to use: 1) TCLP or SPLP test results to compare with the remediation objectives listed in this Table; or 2) the total amount of contaminant in the soil sample results to compare with pH specific remediation objectives listed in Appendix B, Table C or D of this Part. (See Section 742.510.) If the person conducting the remediation wishes to calculate soil remediation objectives based on background concentrations, this should be done in accordance with Subpart D of this Part.
[n] The Agency reserves the right to evaluate the potential for remaining contaminant concentrations to pose significant threats to crops, livestock, or wildlife.
[o] For agrichemical facilities, remediation objectives for surficial soils which are based on field application rates may be more appropriate for currently registered pesticides. Consult the Agency for further information.
[p] For agrichemical facilities, soil remediation objectives based on site-specific background concentrations of Nitrate as N may be more appropriate. Such determinations shall be conducted in accordance with the procedures set forth in Subparts D and I of this Part.
[q] The TCLP extraction must be done using water at a pH of 7.0.
[r] Value based on dietary Reference Dose.
[s] Value based on Reference Dose for Mercuric chloride (CAS No. 7487-94-7).
[t] Note that Table value is likely to be less than background concentration for this chemical; screening or remediation concentrations using the procedures of Subpart D of this Part may be more appropriate.

[u] Value based on Reference Dose for thallium sulfate (CAS No. 7446-18-6).

Section 742.APPENDIX B: Tier 1 Tables and Illustrations

Section 742.Table B: Tier 1 Soil Remediation Objectives[a] for Industrial/Commercial Properties

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	ClassII (mg/kg)	ADL (mg/kg)
83-32-9	Acenaphthene	120,000[b]	-----[c]	120,000[b]	-----[c]	570[b]	2,900	*
67-64-1	Acetone	200,000[b]	100,000[d]	200,000[b]	100,000[d]	16[b]	16	*
15972-60-8	Alachlor[o]	72[e]	-----[c]	1,600[e]	-----[c]	0.04	0.2	NA
116-06-3	Aldicarb[o]	2,000[b]	-----[c]	200[b]	-----[c]	0.013	0.07	NA
309-00-2	Aldrin	0.3[e]	6.6[e]	6.1[b]	9.3[e]	0.5[e]	2.5	*
120-12-7	Anthracene	610,000[b]	-----[c]	610,000[b]	-----[c]	12,000[b]	59,000	*
1912-24-9	Atrazine[o]	72,000[b]	-----[c]	7,100[b]	-----[c]	0.066	0.33	NA
71-43-2	Benzene	200[e]	1.5[e]	4,300[e]	2.1[e]	0.03	0.17	*

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
56-55-3	Benzo(*a*)anthracene	8[e]	-----[c]	170[e]	-----[c]	2	8	*
205-99-2	Benzo(*b*)fluoranthene	8[e]	-----[c]	170[e]	-----[c]	5	25	*
207-08-9	Benzo(*k*)fluroanthene	78[e]	-----[c]	1,700[e]	-----[c]	49	250	*
50-32-8	Benzo(*a*)pyrene	0.8[e]	-----[c]	17[e]	-----[c]	8	82	*
111-44-4	Bis(2-chloroethyl)ether	5[e]	0.47[e]	75[e]	0.66[e]	0.0004[e,f]	0.0004	0.66
117-81-7	Bis(2-ethylhexyl)phthalate	410[e]	31,000[d]	4,100[b]	31,000[d]	3,600	31,000[d]	*
75-27-4	Bromodichloromethane (Dichlorobromomethane)	92[e]	3,000[d]	2,000[e]	3,000[d]	0.6	0.6	*
75-25-2	Bromoform	720[e]	100[e]	16,000[e]	140[e]	0.8	0.8	*
71-36-3	Butanol	200,000[b]	10,000[d]	200,000[b]	10,000[d]	17[b]	17	NA
85-68-7	Butyl benzyl phthalate	410,000[b]	930[d]	410,000[b]	930[d]	930[d]	930[d]	*
86-74-8	Carbazole	290[e]	-----[c]	6,200[e]	-----[c]	0.6[e]	2.8	NA

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
1563-66-2	Carbofuran[o]	10,000[b]	-----[c]	1,000[b]	-----[c]	0.22	1.1	NA
75-15-0	Carbon disulfide	200,000[b]	720[d]	20,000[b]	9.0[b]	32[b]	160	*
56-23-5	Carbon tetrachloride	44[e]	0.64[e]	410[b]	0.90[e]	0.07	0.33	*
57-74-9	Chlordane	4[e]	38[e]	12[b]	53[e]	10	48	*
106-47-8	4 - Chloroaniline (*p*-Chloroaniline)	8,200[b]	-----[c]	820[b]	-----[c]	0.7[b]	0.7	1.3
108-90-7	Chlorobenzene (Monochlorobenzene)	41,000[b]	210[b]	4,100[b]	1.3[b]	1	6.5	*
124-48-1	Chlorodibromomethane (Dibromochloromethane)	41,000[b]	1,300[d]	41,000[b]	1,300[d]	0.4	0.4	*
67-66-3	Chloroform	940[e]	0.54[e]	2,000[b]	0.76[e]	0.6	2.9	*
218-01-9	Chrysene	780[e]	-----[c]	17,000[e]	-----[e]	160	800	*
94-75-7	2,4-D	20,000[b]	-----[c]	2,000[b]	-----[c]	1.5	7.7	*

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
75-99-0	Dalapon	61,000[b]	-----[c]	6,100[b]	-----[c]	0.85	8.5	1.2
72-54-8	DDD	24[e]	-----[c]	520[e]	-----[c]	16[e]	80	*
72-55-9	DDE	17[e]	-----[c]	370[e]	-----[c]	54[e]	270	*
50-29-3	DDT	17[e]	1,500[e]	100[b]	2,100[e]	32[e]	160	*
53-70-3	Dibenzo(*a,h*)anthracene	0.8[e]	-----[c]	17[e]	-----[c]	2	7.6	*
96-12-8	1,2-Dibromo-3-chloropropane	4[e]	17[b]	89[e]	0.11[b]	0.002	0.002	*
106-93-4	1,2-Dibromoethane (Ethylene dibromide)	0.07[e]	0.32[e]	1.5[e]	0.45[e]	0.0004	0.004	0.005
84-74-2	Di-*n*-butyl phthalate	200,000[b]	2,300[d]	200,000[b]	2,300[d]	2,300[d]	2,300[d]	*
95-50-1	1,2-Dichlorobenzene (*o* - Dichlorobenzene)	180,000[b]	560[d]	18,000[b]	310[b]	17	43	*
106-46-7	1,4-Dichlorobenzene (*p* - Dichlorobenzene)	-----[c]	17,000[b]	-----[c]	340[b]	2	11	*

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
91-94-1	3,3'-Dichlorobenzidine	13[e]	-----[c]	280[e]	-----[c]	0.007[e,f]	0.033	1.3
75-34-3	1,1-Dichloroethane	200,000[b]	1,700[d]	200,000[b]	130[b]	23[b]	110	*
107-06-2	1,2-Dichloroethane (Ethylene dichloride)	63[e]	0.70[e]	1,400[e]	0.99[e]	0.02	0.1	*
75-35-4	1,1-Dichloroethylene	18,000[b]	1,500[d]	1,800[b]	1,500[d]	0.06	0.3	*
156-59-2	*cis*-1,2-Dichloroethylene	20,000[b]	1,200[d]	20,000[b]	1,200[d]	0.4	1.1	*
156-60-5	*trans*-1,2-Dichloroethylene	41,000[b]	3,100[d]	41,000[b]	3,100[d]	0.7	3.4	*
78-87-5	1,2-Dichloropropane	84[e]	23[b]	1,800[e]	0.50[b]	0.03	0.15	*
542-75-6	1,3-Dichloropropene (1,3-Dichloropropylene, *cis* + *trans*)	33[e]	0.23[e]	610[b]	0.33[e]	0.004[e]	0.02	0.005
60-57-1	Dieldrin[n]	0.4[e]	2.2[e]	7.8[e]	3.1[e]	0.004[e]	0.02	0.0013
84-66-2	Diethyl phthalate	1,000,000[b]	2,000[d]	1,000,000[b]	2,000[d]	470[b]	470	*

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
105-67-9	2,4-Dimethylphenol	41,000[b]	-----[c]	41,000[b]	-----[c]	9[b]	9	*
121-14-2	2,4-Dinitrotoluene	8.4[e]	-----[c]	180[e]	-----[c]	0.0008[e,f]	0.0008	0.013
606-20-2	2,6-Dinitrotoluene	8.4[e]	-----[c]	180[e]	-----[c]	0.0007[e,f]	0.0007	0.0067
117-84-0	Di-*n*-octyl phthalate	41,000[c]	10,000[d]	4,100[b]	10,000[d]	10,000[d]	10,000[d]	*
115-29-7	Endosulfan	12,000[b]	-----[c]	1,200[b]	-----[c]	18[b]	90	*
145-73-3	Endothall[o]	41,000[c]	-----[c]	4,100[b]	-----[c]	0.4	0.4	NA
72-20-8	Endrin	610[b]	-----[c]	61[b]	-----[c]	1	5	*
100-41-4	Ethylbenzene	200,000[b]	400[d]	20,000[b]	58[b]	13	19	*
206-44-0	Fluoranthene	82,000[b]	-----[c]	82,000[b]	-----[c]	4,300[b]	21,000	*
86-73-7	Fluorene	82,000[b]	-----[c]	82,000[b]	-----[c]	560[b]	2,800	*
76-44-8	Heptachlor	1[e]	11[e]	28[e]	16[e]	23	110	*

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
105-67-9	2,4-Dimethylphenol	41,000[b]	-----[c]	41,000[b]	-----[c]	9[b]	9	*
121-14-2	2,4-Dinitrotoluene	8.4[e]	-----[c]	180[e]	-----[c]	0.0008[e,f]	0.0008	0.013
606-20-2	2,6-Dinitrotoluene	8.4[e]	-----[c]	180[e]	-----[c]	0.0007[e,f]	0.0007	0.0067
117-84-0	Di-*n*-octyl phthalate	41,000[e]	10,000[d]	4,100[b]	10,000[d]	10,000[d]	10,000[d]	*
115-29-7	Endosulfan	12,000[b]	-----[c]	1,200[b]	-----[c]	18[b]	90	*
145-73-3	Endothall[o]	41,000[c]	-----[c]	4,100[b]	-----[c]	0.4	0.4	NA
72-20-8	Endrin	610[b]	-----[c]	61[b]	-----[c]	1	5	*
100-41-4	Ethylbenzene	200,000[b]	400[d]	20,000[b]	58[b]	13	19	*
206-44-0	Fluoranthene	82,000[b]	-----[c]	82,000[b]	-----[c]	4,300[b]	21,000	*
86-73-7	Fluorene	82,000[b]	-----[c]	82,000[b]	-----[c]	560[b]	2,800	*
76-44-8	Heptachlor	1[e]	11[e]	28[e]	16[e]	23	110	*

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
1024-57-3	Heptachlor epoxide	0.6[e]	9.2[e]	2.7[b]	13[e]	0.7	3.3	*
118-74-1	Hexachlorobenzene	4[e]	1.8[e]	78[e]	2.6[e]	2	11	*
319-84-6	*alpha*-HCH (*alpha*-BHC)	0.9[e]	1.5[e]	20[e]	2.1[e]	0.0005[e,f]	0.003	0.002
58-89-9	*gamma*-HCH (Lindane)[n]	4[e]	-----[c]	96[e]	-----[c]	0.009	0.047	*
77-47-4	Hexachlorocyclopentadiene	14,000[b]	16[b]	14,000[b]	1.1[b]	400	2,200[d]	*
67-72-1	Hexachloroethane	2,000[b]	-----[c]	2,000[b]	-----[c]	0.5[b]	2.6	*
193-39-5	Indeno(1,2,3-*c,d*)pyrene	8[e]	-----[c]	170[e]	-----[c]	14	69	*
78-59-1	Isophorone	410,000[b]	4,600[d]	410,000[b]	4,600[d]	8[b]	8	*
72-43-5	Methoxychlor	10,000[b]	-----[c]	1,000[b]	-----[c]	160	780	*
74-83-9	Methyl bromide (Bromomethane)	2,900[b]	15[b]	1,000[b]	3.9[b]	0.2[b]	1.2	*

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
75-09-2	Methylene chloride (Dichloromethane)	760[e]	24[e]	12,000[b]	34[e]	0.02[e]	0.2	*
95-48-7	2-Methylphenol (*o* - Cresol)	100,000[b]	-----[c]	100,000[b]	-----[c]	15[b]	15	*
86-30-6	*N*-Nitrosodiphenylamine	1,200[e]	-----[c]	25,000[e]	-----[c]	1[e]	5.6	0.66
621-64-7	*N*-Nitrosodi-*n*-propylamine	0.8[e]	-----[c]	18[e]	-----[c]	0.00005[e,f]	0.00005	0.66
91-20-3	Naphthalene	82,000[b]	-----[c]	8,200[b]	-----[c]	84[b]	420	*
98-95-3	Nitrobenzene	1,000[b]	140[b]	1,000[b]	9.4[b]	0.1[b,f]	0.1	0.26
108-95-2	Phenol	1,000,000[b]	-----[c]	120,000[b]	-----[c]	100[b]	100	*
1918-02-1	Picloram[o]	140,000[b]	-----[c]	14,000[b]	-----[c]	2	20	NA
1336-36-3	Polychlorinated biphenyls (PCBs)[n]	1; 10; 25[h]	-----[c,h]	1[h]	-----[c,h]	-----[h]	-----[h]	*
129-00-0	Pyrene	61,000[b]	-----[c]	61,000[b]	-----[c]	4,200[b]	21,000	*

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
122-34-9	Simazine[o]	10,000[b]	-----[c]	1,000[b]	-----[c]	0.04	0.37	NA
100-42-5	Styrene	410,000[b]	1,500[d]	41,000[b]	430[b]	4	18	*
127-18-4	Tetrachloroethylene (Perchloroethylene)	110[e]	20[e]	2,400[e]	28[e]	0.06	0.3	*
108-88-3	Toluene	410,000[b]	650[d]	410,000[b]	42[b]	12	29	*
8001-35-2	Toxaphene[n]	5.2[e]	170[e]	110[e]	240[e]	31	150	*
120-82-1	1,2,4-Trichlorobenzene	20,000[b]	3,200[d]	2,000[b]	920[b]	5	53	*
71-55-6	1,1,1-Trichloroethane	-----[c]	1,200[d]	-----[c]	1,200[d]	2	9.6	*
79-00-5	1,1,2-Trichloroethane	8,200[b]	1,800[d]	8,200[b]	1,800[d]	0.02	0.3	*
79-01-6	Trichloroethylene	520[e]	8.9[e]	1,200[b]	12[e]	0.06	0.3	*
108-05-4	Vinyl acetate	1,000,000[b]	1,600[b]	200,000[b]	10[b]	170[b]	170	*

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
75-01-4	Vinyl chloride	3[e]	0.06[e]	65[e]	0.08[e]	0.01[f]	0.07	*
108-38-3	m-Xylene	1,000,000	420[d]	410,000[b]	420[d]	210	210	*
95-47-6	o-Xylene	1,000,000	410[d]	410,000[b]	410[d]	190	190	*
106-42-3	p-Xylene	1,000,000	460[d]	410,000[b]	460[d]	200	200	*
1330-20-7	Xylenes (total)	1,000,000[b]	410[d]	410,000[b]	410[d]	150	150	*
	Ionizable Organics							
65-85-0	Benzoic Acid	1,000,000[b]	-----[c]	820,000[b]	-----[c]	400[b,i]	400[i]	*
95-57-8	2-Chlorophenol	10,000[b]	53,000[d]	10,000[b]	53,000[d]	4[b,i]	20[i]	*
120-83-2	2,4-Dichlorophenol	6,100[b]	-----[c]	610[b]	-----[c]	1[b,i]	1[i]	*
51-28-5	2,4-Dinitrophenol	4,100[b]	-----[c]	410[b]	-----[c]	0.2[b,f,i]	0.2[i]	3.3
88-85-7	Dinoseb[o]	2,000[b]	-----[c]	200[b]	-----[c]	0.34[b,i]	3.4[i]	*

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
87-86-5	Pentachlorophenol	24[e,j]	-----[c]	520[e,j]	-----[c]	0.03[f,i]	0.14[i]	2.4
93-72-1	2,4,5-TP (Silvex)	16,000[b]	-----[c]	1,600[b]	-----[c]	11[i]	55[i]	*
95-95-4	2,4,5-Trichlorophenol	200,000[b]	-----[c]	200,000[b]	-----[c]	270[b,i]	1,400[i]	*
88-06-2	2,4,6- Trichlorophenol	520[e]	390[e]	11,000[e]	540[e]	0.2[e,f,i]	0.77[i]	0.43

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/L)	Class II (mg/L)	
	Inorganics							
7440-36-0	Antimony	820[b]	-----[c]	82[b]	-----[c]	0.006[m]	0.024[m]	*
7440-38-2	Arsenic[l,n]	3[e,l]	1,200[e]	61[b]	25,000[e]	0.05[m]	0.2[m]	
7440-39-3	Barium	140,000[b]	910,000[b]	14,000[b]	870,000[b]	2.0[m]	2.0[m]	*
7440-41-7	Beryllium	1[e,l]	2,100[e]	29[e]	44,000[e]	0.004[m]	0.5[m]	*
7440-42-8	Boron	180,000[h]	1,000,000	18,000[b]	1,000,000	2.0[m]	2.0[m]	*
7440-43-9	Cadmium[l,n]	2,000[b,r]	2,800[e]	200[b,r]	59,000[e]	0.005[m]	0.05[m]	*
16887-00-6	Chloride	-------[c]	-----[c]	-----[c]	-----[c]	200[m]	200[m]	*
7440-47-3	Chromium, total	10,000[b]	420[e]	4,100[b]	8,800[e]	0.1[m]	1.0[m]	*
16065-83-1	Chromium, ion, trivalent	1,000,000[b]	-----[c]	330,000[b]	-----[c]	-----[g]	-----[g]	*
18540-29-9	Chromium, ion, hexavalent	10,000[b]	420[e]	4,100[b]	8,800[e]	-----	-----	*

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/L)	Class II (mg/L)	
7440-48-4	Cobalt	120,000[b]	-----[c]	12,000[b]	-----[c]	1.0[m]	1.0[m]	*
7440-50-8	Copper[n]	82,000[b]	-----[c]	8,200[b]	-----[c]	0.65[m]	0.65[m]	*
57-12-5	Cyanide (amenable)	41,000[b]	-----[c]	4,100[b]	-----[c]	0.2[q]	0.6[q]	*
7782-41-4	Fluoride	120,000[b]	-----[c]	12,000[b]	-----[c]	4.0[m]	4.0[m]	*
15438-31-0	Iron	-----[c]	-----[c]	-----[c]	-----[c]	5.0[m]	5.0[m]	*
7439-92-1	Lead	400[k]	-----[c]	400[k]	-----[c]	0.0075[m]	0.1[m]	*
7439-96-5	Manganese	96,000[b]	91,000[b]	9,600[b]	8,700[b]	0.15[m]	10.0[m]	*
7439-97-6	Mercury[l,n]	610[b]	540,000[b]	61[b,s]	52,000[b]	0.002[m]	0.01[m]	*
7440-02-0	Nickel[l]	41,000[b]	21,000[e]	4,100[b]	440,000[e]	0.1[m]	2.0[m]	*
14797-55-8	Nitrate as N[p]	1,000,000[b]	-----[c]	330,000[b]	-----[c]	10.0[q]	100[q]	*
7782-49-2	Selenium[l,n]	10,000[b]	-----[c]	1,000[b]	-----[c]	0.05[m]	0.05[m]	*

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/L)	Class II (mg/L)	
7440-22-4	Silver	10,000[b]	-----[c]	1,000[b]	-----[c]	0.05[m]	-----	*
14808-79-8	Sulfate	-----[c]	-----[c]	-----[c]	-----[c]	400[m]	400[m]	*
7440-28-0	Thallium	160[b,u]	-----[c]	160[b,u]	-----[c]	0.002[m]	0.02[m]	*
7440-62-2	Vanadium	14,000[b]	-----[c]	1,400[b]	-----[c]	0.049[m]	-----	*
7440-66-6	Zinc[l]	610,000[b]	-----[c]	61,000[b]	-----[c]	5.0[m]	10[m]	*

"*" indicates that the ADL is less than or equal to the specified remediation objective.

NA means Not Available; no PQL or EQL available in USEPA analytical methods.

Chemical Name and Soil Remediation Objective Notations (2nd, 5th thru 8th Columns)

[a] Soil remediation objectives based on human health criteria only.
[b] Calculated values correspond to a target hazard quotient of 1.
[c] No toxicity criteria available for this route of exposure.
[d] Soil saturation concentration ($C_{(sat)}$) = the concentration at which the absorptive limits of the soil particles, the solubility limits of the available soil moisture, and saturation of soil pore air have been reached. Above the soil saturation concentration, the assumptions regarding vapor transport to air and/or dissolved phase transport to groundwater (for chemicals which are liquid at ambient soil temperatures) have been violated, and alternative modeling approaches are required.
[e] Calculated values correspond to a cancer risk level of 1 in 1,000,000.
[f] Level is at or below Contract Laboratory Program required quantitation limit for Regular Analytical Services (RAS).
[g] Chemical-specific properties are such that this route is not of concern at any soil contaminant concentration.
[h] A preliminary goal of 1 ppm has been set for PCBs based on *Guidance on Remedial Actions for Superfund Sites with PCB Contamination*, EPA/540G-90/007, and on USEPA efforts to manage PCB contamination. See 40 CFR 761.120 for USEPA "PCB Spill Cleanup Policy." This regulation goes on to say that the remediation goal for an unrestricted area is 10 ppm and 25 ppm for a restricted area, provided both have at least 10 inches of clean cover.
[i] Soil remediation objective for pH of 6.8. If soil pH is other than 6.8, refer to Appendix B, Tables C and D in this Part.
[j] Ingestion soil remediation objective adjusted by a factor of 0.5 to account for dermal route.
[k] A preliminary remediation goal of 400 mg/kg has been set for lead based on *Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities*, OSWER Directive #9355.4-12.
[l] Potential for soil-plant-human exposure.
[m] The person conducting the remediation has the option to use: (1) TCLP or SPLP test results to compare with the remediation objectives listed in this Table; or (2) the total amount of contaminant in the soil sample results to compare with pH specific remediation objectives listed in Appendix B, Table C or D of this Part. (See Section 742.510.) If the person conducting the remediation wishes to calculate soil remediation objectives based on background concentrations, this should be done in accordance with Subpart D of this Part.
[n] The Agency reserves the right to evaluate the potential for remaining contaminant concentrations to pose significant threats to crops, livestock, or wildlife.
[o] For agrichemical facilities, remediation objectives for surficial soils which are based on field application rates may be more appropriate for currently registered pesticides. Consult the Agency for further information.
[p] For agrichemical facilities, soil remediation objectives based on site-specific background concentrations of Nitrate as N may be more appropriate. Such determinations shall be conducted in accordance with the located in Subparts D and I of this Part.
[q] The TCLP extraction must be done using water at a pH of 7.0.
r Value based on dietary Reference Dose.
s Value based on Reference Dose for Mercuric chloride (CAS No. 7487-94-7).
t Note that Table value is likely to be less than background concentration for this chemical; screening or remediation concentrations using the procedures of Subpart D of this Part.

[u] Value based on Reference Dose for thallium sulfate (CAS No. 7446-18-6).

Section 742.APPENDIX B: Tier 1 Tables and Illustrations

Section 742.Table C: pH Specific Soil Remediation Objectives for Inorganics and Ionizing Organics for the Soil Component of the Groundwater Ingestion Route (Class I Groundwater)

Chemical (totals) (mg/kg)	pH 4.5 to 4.74	pH 4.75 to 5.24	pH 5.25 to 5.74	pH 5.75 to 6.24	pH 6.25 to 6.64	pH 6.65 to 6.89	pH 6.9 to 7.24	pH 7.25 to 7.74	pH 7.75 to 8.0
Inorganics									
Antimony	5	5	5	5	5	5	5	5	5
Arsenic	25	26	27	28	29	29	29	30	31
Barium	260	490	850	1,200	1,500	1,600	1,700	1,800	2,100
Beryllium	1.1	2.1	3.4	6.6	22	63	140	1,000	8,000
Cadmium	1.0	1.7	2.7	3.7	5.2	7.5	11	59	430
Chromium (+6)	70	62	54	46	40	38	36	32	28
Copper	330	580	2,100	11,000	59,000	130,000	200,000	330,000	330,000
Cyanide	40	40	40	40	40	40	40	40	40
Mercury	0.01	0.01	0.03	0.15	0.89	2.1	3.3	6.4	8.0
Nickel	20	36	56	76	100	130	180	700	3,800
Selenium	24	17	12	8.8	6.3	5.2	4.5	3.3	2.4
Silver	0.24	0.33	0.62	1.5	4.4	8.5	13	39	110

Chemical (totals) (mg/kg)	pH 4.5 to 4.74	pH 4.75 to 5.24	pH 5.25 to 5.74	pH 5.75 to 6.24	pH 6.25 to 6.64	pH 6.65 to 6.89	pH 6.9 to 7.24	pH 7.25 to 7.74	pH 7.75 to 8.0
Thallium	1.6	1.8	2.0	2.4	2.6	2.8	3.0	3.4	3.8
Vanadium	980	980	980	980	980	980	980	980	980
Zinc	1,000	1,800	2,600	3,600	5,100	6,200	7,500	16,000	53,000
Organics									
Benzoic Acid	440	420	410	400	400	400	400	400	400
2-Chlorophenol	4.0	4.0	4.0	4.0	3.9	3.9	3.9	3.6	3.1
2,4-Dichlorophenol	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.86	0.69
Dinoseb	8.4	4.5	1.9	0.82	0.43	0.34	0.31	0.27	0.25
Pentachlorophenol	0.54	0.32	0.15	0.07	0.04	0.03	0.02	0.02	0.02
2,4,5-TP (Silvex)	26	16	12	11	11	11	11	11	11
2,4,5-Trichlorophenol	400	390	390	370	320	270	230	130	64
2,4,6-Trichlorophenol	0.37	0.36	0.34	0.29	0.20	0.15	0.13	0.09	0.07

SOURCE: Amended at 22 Ill. Reg. 10874, effective June 8, 1998.

Section 742.APPENDIX B Tier I Tables and Illustrations

Section 742.Table D: pH Specific Soil Remediation Objectives for Inorganics and Ionizing Organics for the Soil Component of the Groundwater Ingestion Route (Class II Groundwater)

Chemical (totals) (mg/kg)	pH 4.5 to 4.74	pH 4.75 to 5.24	pH 5.25 to 5.74	pH 5.75 to 6.24	pH 6.25 to 6.64	pH 6.65 to 6.89	pH 6.9 to 7.24	pH 7.25 to 7.74	pH 7.75 to 8.0
Inorganics									
Antimony	20	20	20	20	20	20	20	20	20
Arsenic	100	100	100	110	110	120	120	120	120
Barium	260	490	850	1,200	1,500	1,600	1,700	1,800	2,100
Beryllium	140	260	420	820	2,800	7,900	17,000	130,000	1,000,000
Cadmium	10	17	27	37	52	75	110	590	4,300
Chromium (+6)	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Copper	330	580	2,100	11,000	59,000	130,000	200,000	330,000	330,000
Cyanide	120	120	120	120	120	120	120	120	120
Mercury	0.05	0.06	0.14	0.75	4.4	10	16	32	40
Nickel	400	730	1,100	1,500	2,000	2,600	3,500	14,000	76,000
Selenium	24	17	12	8.8	6.3	5.2	4.5	3.3	2.4
Thallium	16	18	20	24	26	28	30	34	38
Zinc	2,000	3,600	5,200	7,200	10,000	12,000	15,000	32,000	110,000

Chemical (totals) (mg/kg)	pH 4.5 to 4.74	pH 4.75 to 5.24	pH 5.25 to 5.74	pH 5.75 to 6.24	pH 6.25 to 6.64	pH 6.65 to 6.89	pH 6.9 to 7.24	pH 7.25 to 7.74	pH 7.75 to 8.0
Organics									
Benzoic Acid	440	420	410	400	400	400	400	400	400
2-Chlorophenol	20	20	20	20	20	20	19	3.6	3.1
2,4-Dichlorophenol	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.86	0.69
Dinoseb	84	45	19	8.2	4.3	3.4	3.1	2.7	2.5
Pentachlorophenol	2.7	1.6	0.75	0.33	0.18	0.15	0.12	0.11	0.10
2,4,5-TP (Silvex)	130	79	62	57	55	55	55	55	55
2,4,5-Trichlorophenol	2,000	2,000	1,900	1,800	1,600	1,400	1,200	640	64
2,4,6-Trichlorophenol	1.9	1.8	1.7	1.4	1.0	0.77	0.13	0.09	0.07

SOURCE: Amended at 22 Ill. Reg. 10847, effective, June 8, 1998.

Section 742.APPENDIX B
Section 742.Table D: pH Specific Soil Remediation Objectives for Inorganics and Ionizing Organics for the Soil Component of the Groundwater Ingestion Route (Class II Groundwater)

Chemical (totals) (mg/kg)	pH 4.5 to 4.74	pH 4.75 to 5.24	pH 5.25 to 5.74	pH 5.75 to 6.24	pH 6.25 to 6.64	pH 6.65 to 6.89	pH 6.9 to 7.24	pH 7.25 to 7.74	pH 7.75 to 8.0
Inorganics									
Antimony	20	20	20	20	20	20	20	20	20
Arsenic	100	100	100	110	110	120	120	120	120
Barium	260	490	850	1,200	1,500	1,600	1,700	1,800	2,100
Beryllium	140	260	420	820	2,800	7,900	17,000	130,000	1,000,000

Cadmium	10	17	27	37	52	75	110	590	4,300
Chromium (+6)	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Copper	330	580	2,100	11,000	59,000	130,000	200,000	330,000	330,000
Cyanide	120	120	120	120	120	120	120	120	120
Mercury	0.05	0.06	0.14	0.75	4.4	10	16	32	40
Nickel	400	730	1,100	1,500	2,000	2,600	3,500	14,000	76,000
Selenium	24	17	12	8.8	6.3	5.2	4.5	3.3	2.4
Thallium	16	18	20	24	26	28	30	34	38
Zinc	2,000	3,600	5,200	7,200	10,000	12,000	15,000	32,000	110,000

Chemical (totals) (mg/kg)	pH 4.5 to 4.74	pH 4.75 to 5.24	pH 5.25 to 5.74	pH 5.75 to 6.24	pH 6.25 to 6.64	pH 6.65 to 6.89	pH 6.9 to 7.24	pH 7.25 to 7.74	pH 7.75 to 8.0
Organics									
Benzoic Acid	440	420	410	400	400	400	400	400	400
2-Chlorophenol	20	20	20	20	20	20	19	3.6	3.1
2,4-Dichlorophenol	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.86	0.69
Dinoseb	84	45	19	8.2	4.3	3.4	3.1	2.7	2.5
Pentachlorophenol	2.7	1.6	0.75	0.33	0.18	0.15	0.12	0.11	0.10
2,4,5-TP (Silvex)	130	79	62	57	55	55	55	55	55
2,4,5-Trichlorophenol	2,000	2,000	1,900	1,800	1,600	1,400	1,200	640	64
2,4,6-Trichlorophenol	0.37	0.36	0.34	0.26	0.20	0.15	0.13	0.09	0.07

Section 742.APPENDIX B: Tier 1 Tables and Illustrations

Section 742.TABLE E: Tier 1 Groundwater Remediation Objectives for the Groundwater Component of the Groundwater Ingestion Route

		Groundwater Remediation Objective	
CAS No.	Chemical Name	Class I (mg/L)	Class II (mg/L)
83-32-9	Acenaphthene	0.42	2.1
67-64-1	Acetone	0.7	0.7
15972-60-8	Alachlor	0.002[c]	0.01[c]
116-06-3	Aldicarb	0.003[c]	0.015[c]
309-00-2	Aldrin	0.00004[a]	0.0002
120-12-7	Anthracene	2.1	10.5
1912-24-9	Atrazine	0.003[c]	0.015[c]
71-43-2	Benzene	0.005[c]	0.025[c]
56-55-3	Benzo(*a*)anthracene	0.00013[a]	0.00065
205-99-2	Benzo(*b*)fluoranthene	0.00018[a]	0.0009
207-08-9	Benzo(*k*)fluroanthene	0.00017[a]	0.00085
50-32-8	Benzo(*a*)pyrene	0.0002[a,c]	0.002[c]
111-44-4	Bis(2-chloroethyl)ether	0.01[a]	0.01
117-81-7	Bis(2-ethylhexyl)phthalate	0.006[a,c]	0.06[c]
75-27-4	Bromodichloromethane (Dichlorobromomethane)	0.00002[a]	0.00002
75-25-2	Bromoform	0.0002[a]	0.0002
71-36-3	Butanol	0.7	0.7
85-68-7	Butyl benzyl phthalate	1.4	7.0
86-74-8	Carbazole	---	---
1563-66-2	Carbofuran	0.04[c]	0.2[c]
75-15-0	Carbon disulfide	0.7	3.5
56-23-5	Carbon tetrachloride	0.005[c]	0.025[c]
57-74-9	Chlordane	0.002[c]	0.01[c]

		Groundwater Remediation Objective	
CAS No.	Chemical Name	Class I (mg/L)	Class II (mg/L)
108-90-7	Chlorobenzene (Monochlorobenzene)	0.1[c]	0.5[c]
124-48-1	Chlorodibromomethane (Dibromochloromethane)	0.14	0.14
67-66-3	Chloroform	0.00002[a]	0.0001
218-01-9	Chrysene	0.0015[a]	0.0075
94-75-7	2,4-D	0.07[c]	0.35[c]
75-99-0	Dalapon	0.2[c]	2.0[c]
72-54-8	DDD	0.00011[a]	0.00055
72-55-9	DDE	0.00004[a]	0.0002
50-29-3	DDT	0.00012[a]	0.0006
53-70-3	Dibenzo(*a,h*)anthracene	0.0003[a]	0.0015
96-12-8	1,2-Dibromo-3-chloropropane	0.0002[c]	0.0002[c]
106-93-4	1,2-Dibromoethane (Ethylene dibromide)	0.00005[a,c]	0.0005[c]
84-74-2	Di-*n*-butyl phthalate	0.7	3.5
95-50-1	1,2-Dichlorobenzene (*o* - Dichlorobenzene)	0.6[c]	1.5[c]
106-46-7	1,4-Dichlorobenzene (*p* - Dichlorobenzene)	0.075[c]	0.375[c]
91-94-1	3,3'-Dichlorobenzidine	0.02[a]	0.1
75-34-3	1,1-Dichloroethane	0.7	3.5
107-06-2	1,2-Dichloroethane (Ethylene dichloride)	0.005[c]	0.025[c]
75-35-4	1,1-Dichloroethylene[b]	0.007[c]	0.035[c]
156-59-2	*cis*-1,2-Dichloroethylene	0.07[c]	0.2[c]
156-60-5	*trans*-1,2-Dichloroethylene	0.1[c]	0.5[c]
78-87-5	1,2-Dichloropropane	0.005[c]	0.025[c]
542-75-6	1,3-Dichloropropene (1,3-Dichloropropylene, *cis* + *trans*)	0.001[a]	0.005

CAS No.	Chemical Name	Groundwater Remediation Objective	
		Class I (mg/L)	Class II (mg/L)
60-57-1	Dieldrin	0.00002[a]	0.0001
84-66-2	Diethyl phthalate	5.6	5.6
121-14-2	2,4-Dinitrotoluene[a]	0.00002	0.00002
606-20-2	2,6-Dinitrotoluene[a]	0.0001	0.0001
88-85-7	Dinoseb	0.007[c]	0.07[c]
117-84-0	Di-*n*-octyl phthalate	0.14	0.7
115-29-7	Endosulfan	0.042	0.21
145-73-3	Endothall	0.1[c]	0.1[c]
72-20-8	Endrin	0.002[c]	0.01[c]
100-41-4	Ethylbenzene	0.7[c]	1.0[c]
206-44-0	Fluoranthene	0.28	1.4
86-73-7	Fluorene	0.28	1.4
76-44-8	Heptachlor	0.0004[c]	0.002[c]
1024-57-3	Heptachlor epoxide	0.0002[c]	0.001[c]
118-74-1	Hexachlorobenzene	0.00006[a]	0.0003
319-84-6	*alpha*-HCH (*alpha*-BHC)	0.00003[a]	0.00015
58-89-9	*gamma*-HCH (Lindane)	0.0002[c]	0.001[c]
77-47-4	Hexachlorocyclopentadiene	0.05[c]	0.5[c]
67-72-1	Hexachloroethane	0.007	0.035
193-39-5	Indeno(1,2,3-*c,d*)pyrene	0.00043[a]	0.00215
78-59-1	Isophorone	1.4	1.4
72-43-5	Methoxychlor	0.04[c]	0.2[c]
74-83-9	Methyl bromide (Bromomethane)	0.0098	0.049
75-09-2	Methylene chloride (Dichloromethane)	0.005[c]	0.05[c]
91-20-3	Naphthalene[2]	0.025	0.039
98-95-3	Nitrobenzene[2]	0.0035	0.0035

		Groundwater Remediation Objective	
CAS No.	Chemical Name	Class I (mg/L)	Class II (mg/L)
1918-02-1	Picloram	0.5[c]	5.0[c]
1336-36-3	Polychlorinated biphenyls (PCBs)[n]	0.0005[c]	0.0025[c]
129-00-0	Pyrene	0.21	1.05
122-34-9	Simazine	0.004[c]	0.04[c]
100-42-5	Styrene	0.1[c]	0.5[c]
93-72-1	2,4,5-TP (Silvex)	0.05[c]	0.25[c]
127-18-4	Tetrachloroethylene (Perchloroethylene)	0.005[c]	0.025[c]
108-88-3	Toluene	1.0[c]	2.5[c]
8001-35-2	Toxaphene	0.003[c]	0.015[c]
120-82-1	1,2,4-Trichlorobenzene	0.07[c]	0.7[c]
71-55-6	1,1,1-Trichloroethane[2]	0.2[c]	1.0[c]
79-00-5	1,1,2-Trichloroethane	0.005[c]	0.05[c]
79-01-6	Trichloroethylene	0.005[c]	0.025[c]
108-05-4	Vinyl acetate	7.0	7.0
75-01-4	Vinyl chloride	0.002[c]	0.01[c]
1330-20-7	Xylenes (total)	10.0[c]	10.0[c]
	Ionizable Organics		
65-85-0	Benzoic Acid	28	28
106-47-8	4-Chloroaniline (*p*-Chloroaniline)	0.028	0.028
95-57-8	2-Chlorophenol	0.035	0.175
120-83-2	2,4-Dichlorophenol	0.021	0.021
105-67-9	2,4-Dimethylphenol	0.14	0.14
51-28-5	2,4-Dinitrophenol	0.014	0.014
95-48-7	2-Methylphenol (*o* - Cresol)	0.35	0.35
86-30-6	*N*-Nitrosodiphenylamine	0.01[a]	0.05

		Groundwater Remediation Objective	
CAS No.	Chemical Name	Class I (mg/L)	Class II (mg/L)
621-64-7	*N*-Nitrosodi-*n*-propylamine	0.01[a]	0.01
87-86-5	Pentachlorophenol	0.001[a,c]	0.005[c]
108-95-2	Phenol	0.1[c]	0.1[c]
95-95-4	2,4,5-Trichlorophenol	0.7	3.5
88-06-2	2,4,6 Trichlorophenol	0.0064[a]	0.032
	Inorganics		
7440-36-0	Antimony	0.006[c]	0.024[c]
7440-38-2	Arsenic	0.05[c]	0.2[c]
7440-39-3	Barium	2.0[c]	2.0[c]
7440-41-7	Beryllium	0.004[c]	0.5[c]
7440-42-8	Boron	2.0[c]	2.0[c]
7440-43-9	Cadmium	0.005[c]	0.05[c]
16887-00-6	Chloride	200[c]	200[c]
7440-47-3	Chromium, total	0.1[c]	1.0[c]
18540-29-9	Chromium, ion, hexavalent	—	—
7440-48-4	Cobalt	1.0[c]	1.0[c]
7440-50-8	Copper	0.65[c]	0.65[c]
57-12-5	Cyanide	0.2[c]	0.6[c]
7782-41-4	Fluoride	4.0[c]	4.0[c]
15438-31-0	Iron	5.0[c]	5.0[c]
7439-92-1	Lead	0.0075[c]	0.1[c]
7439-96-5	Manganese	0.15[c]	10.0[c]
7439-97-6	Mercury	0.002[c]	0.01[c]
7440-02-0	Nickel	0.1[c]	2.0[c]
14797-55-8	Nitrate as N	10.0[c]	100[c]
7782-49-2	Selenium	0.05[c]	0.05[c]
7440-22-4	Silver	0.05[c]	—
14808-79-8	Sulfate	400[c]	400[c]

		Groundwater Remediation Objective	
CAS No.	Chemical Name	Class I (mg/L)	Class II (mg/L)
7440-28-0	Thallium	0.002[c]	0.02[c]
7440-62-2	Vanadium[2]	0.049	—
7440-66-6	Zinc	5.0[c]	10[c]

<u>Chemical Name and Groundwater Remediation Objective Notations</u>

[a] The groundwater Health Advisory concentration is equal to ADL for carcinogens.

[b] Oral Reference Dose and/or Reference Concentration under review by USEPA. Listed values subject to change.

[c] Value listed is also the Groundwater Quality Standard for this chemical pursuant to 35 Ill. Adm. Code 620.410 for Class I Groundwater or 35 Ill. Adm. Code 620.420 for Class II Groundwater.

Section 742.APPENDIX B: Tier 1 Tables and Illustrations

Section 742.TABLE F: Values Used to Calculate the Tier 1 Soil Remediation Objectives for the Soil Component of the Groundwater Ingestion Route

		GW_{obj} Concentration used to Calculate Tier 1 Soil Rememdiation Objectives[a]	
CAS No.	Chemical Name	Class I (mg/L)	Class II (mg/L)
83-32-9	Acenaphthene	2.0[b]	10
67-64-1	Acetone	4.0[b]	4.0
15972-60-8	Alachlor	0.002[c]	0.01[c]
116-06-3	Aldicarb	0.003[c]	0.015[c]
309-00-2	Aldrin	5.0E-6[b]	2.5E-5
120-12-7	Anthracene	10[b]	50
1912-24-9	Atrazine	0.003[c]	0.015[c]
71-43-2	Benzene	0.005[c]	0.025[c]
56-55-3	Benzo(*a*)anthracene	0.0001[b]	0.0005
205-99-2	Benzo(*b*)fluoranthene	0.0001[b]	0.0005
207-08-9	Benzo(*k*)fluroanthene	0.001[b]	0.005
50-32-8	Benzo(*a*)pyrene	0.0002[a,c]	0.002[c]
111-44-4	Bis(2-chloroethyl)ether	8.0E-5[b]	8.0E-5
117-81-7	Bis(2-ethylhexyl)phthalate	0.006[a,c]	0.06[c]
75-27-4	Bromodichloromethane (Dichlorobromomethane)	0.1[b]	0.1
75-25-2	Bromoform	0.1[b]	0.01
71-36-3	Butanol	4.0[b]	4.0
85-68-7	Butyl benzyl phthalate	7.0[b]	35
86-74-8	Carbazole	0.004[b]	0.02
1563-66-2	Carbofuran	0.04[c]	0.2[c]
75-15-0	Carbon disulfide	4.0[b]	20
56-23-5	Carbon tetrachloride	0.005[c]	0.025[c]
57-74-9	Chlordane	0.002[c]	0.01[c]

CAS No.	Chemical Name	GW$_{obj}$ Concentration used to Calculate Tier 1 Soil Rememdiation Objectives[a] Class I (mg/L)	Class II (mg/L)
108-90-7	Chlorobenzene (Monochlorobenzene)	0.1[c]	0.5[c]
124-48-1	Chlorodibromomethane (Dibromochloromethane)	0.06[b]	0.06
67-66-3	Chloroform	0.1[b]	0.5
218-01-9	Chrysene	0.1[b]	0.05
94-75-7	2,4-D	0.07[c]	0.35[c]
75-99-0	Dalapon	0.2[c]	2.0[c]
72-54-8	DDD	0.0004[b]	0.002
72-55-9	DDE	0.0003[b]	0.0015
50-29-3	DDT	0.0003[b]	0.0015
53-70-3	Dibenzo(*a,h*)anthracene	1.0E-5[b]	5.0E-5
96-12-8	1,2-Dibromo-3-chloropropane	0.0002[c]	0.0002[c]
106-93-4	1,2-Dibromoethane (Ethylene dibromide)	0.00005[a,c]	0.0005[c]
84-74-2	Di-*n*-butyl phthalate	4.0[b]	20
95-50-1	1,2-Dichlorobenzene (*o* - Dichlorobenzene)	0.6[c]	1.5[c]
106-46-7	1,4-Dichlorobenzene (*p* - Dichlorobenzene)	0.075[c]	0.375[c]
91-94-1	3,3'-Dichlorobenzidine	0.0002[b]	0.001
75-34-3	1,1-Dichloroethane	4.0[b]	20
107-06-2	1,2-Dichloroethane (Ethylene dichloride)	0.005[c]	0.025[c]
75-35-4	1,1-Dichloroethylene	0.007[c]	0.035[c]
156-59-2	*cis*-1,2-Dichloroethylene	0.07[c]	0.2[c]
156-60-5	*trans*-1,2-Dichloroethylene	0.1[c]	0.5[c]
78-97-5	1,2-Dichloropropane	0.005[c]	0.025[c]
542-75-6	1,3-Dichloropropene (1,3-Dichloropropylene, *cis* + *trans*)	0.0005[b]	0.0025

		GW$_{obj}$ Concentration used to Calculate Tier 1 Soil Rememdiation Objectives[a]	
CAS No.	Chemical Name	Class I (mg/L)	Class II (mg/L)
60-57-1	Dieldrin	5.0E-6[b]	2.5E-5
84-66-2	Diethyl phthalate	30[b]	30
121-14-2	2,4-Dinitrotoluene	0.0001[b]	0.0001
606-20-2	2,6-Dinitrotoluene	0.0001	0.0001
88-85-7	Dinoseb	0.007[c]	0.07[c]
117-84-0	Di-*n*-octyl phthalate	0.7[b]	3.5
115-29-7	Endosulfan	0.2[b]	1.0
145-73-3	Endothall	0.1[c]	0.1[c]
72-20-8	Endrin	0.002[c]	0.01[c]
100-41-4	Ethylbenzene	0.7[c]	1.0[c]
206-44-0	Fluoranthene	1.0[b]	5.0
86-73-7	Fluorene	1.0[b]	5.0
76-44-8	Heptachlor	0.0004[c]	0.002[c]
1024-57-3	Heptachlor epoxide	0.0002[c]	0.001[c]
118-74-1	Hexachlorobenzene	0.001[b]	0.005
319-84-6	*alpha*-HCH (*alpha*-BHC)	1.0E-5[b]	5.0E-5
58-89-9	*gamma*-HCH (Lindane)	0.0002[c]	0.001[c]
77-47-4	Hexachlorocyclopentadiene	0.05[c]	0.5[c]
67-72-1	Hexachloroethane	0.007	0.035
193-39-5	Indeno(1,2,3-*c,d*)pyrene	0.0001[b]	0.0005
78-59-1	Isophorone	1.4	1.4
72-43-5	Methoxychlor	0.04[c]	0.2[c]
74-83-9	Methyl bromide (Bromomethane)	0.05[b]	0.25
75-09-2	Methylene chloride (Dichloromethane)	0.005[c]	0.05[c]
91-20-3	Naphthalene	1.0[b]	5.0
98-95-3	Nitrobenzene	0.02[b]	0.02

CAS No.	Chemical Name	GW$_{obj}$ Concentration used to Calculate Tier 1 Soil Rememdiation Objectives[a] Class I (mg/L)	Class II (mg/L)
1918-02-1	Picloram	0.5[c]	5.0[c]
1336-36-3	Polychlorinated biphenyls (PCBs)	---	---
129-00-0	Pyrene	1.0[b]	5.0
122-34-9	Simazine	0.004[c]	0.04[c]
100-42-5	Styrene	0.1[c]	0.5[c]
93-72-1	2,4,5-TP (Silvex)	0.05[c]	0.25[c]
127-18-4	Tetrachloroethylene (Perchloroethylene)	0.005[c]	0.025[c]
108-88-3	Toluene	1.0[c]	2.5[c]
8001-35-2	Toxaphene	0.003[c]	0.015[c]
120-82-1	1,2,4-Trichlorobenzene	0.07[c]	0.7[c]
71-55-6	1,1,1-Trichloroethane[2]	0.2[c]	1.0[c]
79-00-5	1,1,2-Trichloroethane	0.005[c]	0.05[c]
79-01-6	Trichloroethylene	0.005[c]	0.025[c]
108-05-4	Vinyl acetate	40[b]	40
75-01-4	Vinyl chloride	0.002[c]	0.01[c]
1330-20-7	Xylenes (total)	10.0[c]	10.0[c]
	Ionizable Organics		
65-85-0	Benzoic Acid	100[b]	100
106-47-8	4-Chloroaniline (*p*-Chloroaniline)	0.1[b]	0.1
95-57-8	2-Chlorophenol	0.2[b]	1.0
120-83-2	2,4-Dichlorophenol	0.1[b]	0.1
105-67-9	2,4-Dimethylphenol	0.7[b]	0.7
51-28-5	2,4-Dinitrophenol	0.04[b]	0.04
95-48-7	2-Methylphenol (*o* - Cresol)	2.0[b]	2.0
86-30-6	*N*-Nitrosodiphenylamine	0.02[b]	0.1

		GWobj Concentration used to Calculate Tier 1 Soil Rememdiation Objectives[a]	
CAS No.	Chemical Name	Class I (mg/L)	Class II (mg/L)
621-64-7	*N*-Nitrosodi-*n*-propylamine	1.0E-5[b]	1.0E-5
87-86-5	Pentachlorophenol	0.001[a,c]	0.005[c]
108-95-2	Phenol	0.1[c]	0.1[c]
95-95-4	2,4,5-Trichlorophenol	4.0[b]	20
88-06-2	2,4,6-Trichlorophenol	0.008[b]	0.04
	Inorganics		
7440-36-0	Antimony	0.006[c]	0.024[c]
7440-38-2	Arsenic	0.05[c]	0.2[c]
7440-39-3	Barium	2.0[c]	2.0[c]
7440-41-7	Beryllium	0.004[c]	0.5[c]
7440-42-8	Boron	2.0[c]	2.0[c]
7440-43-9	Cadmium	0.005[c]	0.05[c]
16887-00-6	Chloride	200[c]	200[c]
7440-47-3	Chromium, total	0.1[c]	1.0[c]
18540-29-9	Chromium, ion, hexavalent	—	—
7440-48-4	Cobalt	1.0[c]	1.0[c]
7440-50-8	Copper	0.65[c]	0.65[c]
57-12-5	Cyanide	0.2[c]	0.6[c]
7782-41-4	Fluoride	4.0[c]	4.0[c]
15438-31-0	Iron	5.0[c]	5.0[c]
7439-92-1	Lead	0.0075[c]	0.1[c]
7439-96-5	Manganese	0.15[c]	10.0[c]
7439-97-6	Mercury	0.002[c]	0.01[c]
7440-02-0	Nickel	0.1[c]	2.0[c]
14797-55-8	Nitrate as N	10.0[c]	100[c]
7782-49-2	Selenium	0.05[c]	0.05[c]
7440-22-4	Silver	0.05[c]	—
14808-79-8	Sulfate	400[c]	400[c]

		GW_{obj} Concentration used to Calculate Tier 1 Soil Rememdiation Objectives[a]	
CAS No.	Chemical Name	Class I (mg/L)	Class II (mg/L)
7440-28-0	Thallium	0.002[c]	0.02[c]
7440-62-2	Vanadium	0.049	—
7440-66-6	Zinc	5.0[c]	10[c]

Chemical Name and Groundwater Remediation Objective Notations

[a] The Equation S17 is used to calculate the Soil Remediation Objective for the Soil Component of the Groundwater Ingestion Route; this equation requires calculation of the Target Soil Leachate Concentration (C_w) from Equation S18: $C_w = DF \times GW_{obj}$.

[b] Value listed is the Water Health Based Limit (HBL) for this chemical from Soil Screening Guidance: User's Guide, incorporated by reference at Section 742.210; for carcinogens, the HBL is equal to a cancer risk of 1.0E-6, and for noncarcinogens is equal to a Hazard Quotient of 1.0. NOTE: These GW_{obj} concentrations are not equal to the Tier 1 Groundwater Remediation Objectives for the Direct Ingestion of Groundwater Component of the Groundwater Ingestion Route, listed in Section 742.Appendix B, Table E.

[c] Value listed is also the Groundwater Quality Standard for this chemical pursuant to 35 Ill. Adm. Code 620.410 for Class I Groundwater or 35 Ill. Adm. Code 620.420 for Class II Groundwater.

APPENDIX C

USEPA REGION 9 PRELIMINARY REMEDIATION GOALS

Key : I=IRIS n=NCEA h=HEAST x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION / **CONTAMINANT**

SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)		V O C	skin abs. soils	CAS No.	Contaminant
8 7E-03	i	4 0E-03	i	8 7E-03	r	4 0E-03	r	0	0 10	30560-19-1	Acephate
				7 7E-03	i	2 6E-03	i	1		75-07-0	Acetaldehyde
		2 0E-02	i			2 0E-02	r	0	0 10	34256-82-1	Acetochlor
		1 0E-01	i			1 0E-01	r	1		67-64-1	Acetone
		8 0E-04	h			8 0E 04	r	0	0 10	75-86-5	Acetone cyanohydrin
		6 0E-03	x			1.7E-02	i	1		75-05-8	Acetonitrile
		1 0E-01	i			5 7E-06	x	1		98 86-2	Acetophenone
1 1E-01	o	1 3E-02	i	1 1E-01	r	1 3E-02	r	0	0 10	50594-66-6	Acifluorfen
		2 0E-02	h			5 7E-06	i	1		107-02-8	Acrolein
4 6E+00	i	2 0E-04	i	4 6E+00	i	2 0E-04	r	0	0 10	79-06-1	Acrylamide
		5 0E-01	i			2 9E-04	i	0	0 10	79-10 7	Acrylic acid
5 4E-01	i	1 0E-03	h	2 4E-01	i	5 7E-04	i	1		107-13-1	Acrylonitrile
8 1E-02	h	1 0E-02	i	8 0E-02	r	1 0E-02	r	0	0 10	15972 60-8	Alachlor
		1 5E-01	i			1 5E-01	r	0	0 10	1596 84-5	Alar
		1 0E-03	i			1 0E-03	r	0	0 10	116-06-3	Aldicarb
		1 0E-03	i			1 0E-03	r	0	0 10	1646 88 4	*Aldicarb sulfone*
1 7E+01	i	3 0E-05	i	1 7E+01	i	3 0E-05	r	0	0 10	309-00-2	Aldrin
		2 5E-01	i			2 5E-01	r	0	0 10	5585-64-8	Ally
		5 0E-03	i			5 0E-03	r	0	0 10	107-18 6	Allyl alcohol
		5 0E-02	h			2 9E-04	i	0	0 10	107-05-1	Allyl chloride
		1 0E+00	n			1.4E-03	n	0		7429-90-5	**Aluminum**
		4 0E-04	i					0		20859-73-8	Aluminum phosphide
		3 0E-04	i			3 0E-04	r	0	0 10	67485-29 4	Amdro
		9 0E-03	i			9 0E-03	r	0	0 10	834-12-8	Ametryn
		7 0E-02	h			7 0E-02	r	0	0 10	591-27-5	m-Aminophenol
		2 0E-05	h			2 0E-05	r	0	0 10	504-24 5	4-Aminopyridine
		2 5E-03	i			2 5E-03	r	0	0 10	33089-61-1	Amitraz
						2 9E-02	i			7664-41-7	Ammonia
		2 0E-01	i					0	0 10	7773-06-0	Ammonium sulfamate
5 7E-03	i	7 0E-03	n	5 7E-03	r	2 9E-04	i	0	0 10	62-53-3	Aniline
		4 0E-04	i					0		7440-36-0	Antimony and compounds
		5 0E-04	*h*					*0*		*1314-60-9*	*Antimony pentoxide*
		9 0E-04	h					0		28300-74-5	Antimony potassium tartrate
		4 0E-04	h					0		1332-81-6	Antimony tetroxide
		4 0E-04	h			5.7E-05	i	0		1309-64-4	**Antimony trioxide**
		1 3E-02	i			1 3E-02	r	0	0 10	74115-24 5	Apollo
2 5E-02	i	5 0E-02	h	2 5E-02	i	5 0E 02	r	0	0 10	140-57-8	Aramite
		3 0E-04	i					0	0 03	7440-38 2	Arsenic (noncancer endpoint)
1 5E+00	i	3 0E-04	i	1 5E+01	i			0	0 03	7440-38-2	Arsenic (cancer endpoint)
						1 4E-05	i			7784 42-1	Arsine (see arsenic for cancer endpoint)
		9 0E-03	i			9 0E-03	r	0	0 10	76578-12 6	Assure
		5 0E-02	i			5 0E-02	r	0	0 10	3337-71-1	Asulam
2 2E-01	h	3 5E-02	h	2 2E-01	r	3 5E-02	r	0	0 10	1912-24-9	Atrazine
		4 0E 04	i			4 0E-04	r	0	0 10	71751-41-2	Avermectin B1
1 1E-01	i			1 1E-01	i			0	0 10	103-33-3	Azobenzene
		7 0E-02	i			1 4E-04	h	0		7440-39-3	Barium and compounds
		4 0E-03	i			4 0E-03	r	0	0 10	114-26-1	Baygon
		3 0E-02	*i*			*3 0E-02*	*r*	*0*	*0 10*	*43121-43-3*	*Bayleton*
		2 5E-02	i			2 5E-02	r	0	0 10	68359 37-5	Baythroid
		3 0E 01	i			3 0E 01	r	0	0 10	1861-40-1	Benefin
		5 0E-02	i			5 0E-02	r	0	0 10	17804-35-2	Benomyl
		3 0E-02	i			3 0E-02	r	0	0 10	25057-89-0	Bentazon
		1 0E-01	i			1 0E-01	r	0	0 10	100 52-7	Benzaldehyde
2 9E-02	i	3 0E-03	n	2 7E-02	i	1 7E-03	n	1		71-43-2	Benzene
2 3E+02	i	3 0E-03	i	2 3E+02	i	3 0E-03	r	0	0 10	92-87-5	Benzidine
		4 0E+00	i			4 0E+00	r	0	0 10	65-85-0	Benzoic acid
1 3E+01	i			1 3E+01	r			0	0 10	98-07-7	Benzotrichloride
		3 0E-01	h			3 0E-01	r	0	0 10	100-51-6	Benzyl alcohol

PRELIMINARY REMEDIATION GOALS (PRGs) / **SOIL SCREENING LEVELS** (Migration to Ground Water)

Contaminant	Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
Acephate	5.6E+01	ca**	2.8E+02	ca*	7.7E-01	ca*	7.7E+00	ca*		
Acetaldehyde	1.1E+01	ca**	2.3E+01	ca**	8.7E-01	ca*	1.7E+00	ca		
Acetochlor	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
Acetone	1.6E+03	nc	6.2E+03	nc	3.7E+02	nc	6.1E+02	nc	2E+01	8E-01
Acetone cyanohydrin	4.9E+01	nc	7.0E+02	nc	2.9E+00	nc	2.9E+01	nc		
Acetonitrile	2.7E+02	nc	1.7E+03	nc	6.2E+01	nc	7.9E+01	nc		
Acetophenone	4.9E-01	nc	1.6E+00	nc	2.1E-02	nc	4.2E-02	nc		
Acifluorfen	4.4E+00	ca	2.2E+01	ca	6.1E-02	ca	6.1E-01	ca		
Acrolein	1.0E-01	nc	3.4E-01	nc	2.1E-02	nc	4.2E-02	nc		
Acrylamide	1.1E-01	ca	5.4E-01	ca	1.5E-03	ca	1.5E-02	ca		
Acrylic acid	2.9E+04	nc	1.0E+05	max	1.0E+00	nc	1.8E+04	nc		
Acrylonitrile	2.1E-01	ca*	5.1E-01	ca*	2.8E-02	ca*	3.9E-02	ca*		
Alachlor	6.0E+00	ca	3.1E+01	ca	8.4E-02	ca	8.4E-01	ca		
Alar	9.2E+03	nc	1.0E+05	max	5.5E+02	nc	5.5E+03	nc		
Aldicarb	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc		
Aldicarb sulfone	*6.1E+01*	*nc*	*8.8E+02*	*nc*	*3.7E+00*	*nc*	*3.6E+01*	*nc*		
Aldrin	2.9E-02	ca*	1.5E-01	ca	3.9E-04	ca	4.0E-03	ca	1.2E+04	6E+02
Ally	1.5E+04	nc	1.0E+05	max	9.1E+02	nc	9.1E+03	nc		
Allyl alcohol	3.1E+02	nc	4.4E+03	nc	1.8E+01	nc	1.8E+02	nc		
Allyl chloride	3.0E+03	nc	4.3E+04	nc	1.0E+00	nc	1.8E+03	nc		
Aluminum	7.6E+04	nc	1.0E+05	max	5.1E+00	nc	3.6E+04	nc		
Aluminum phosphide	3.1E+01	nc	8.2E+02	nc			1.5E+01	nc		
Amdro	1.8E+01	nc	2.6E+02	nc	1.1E+00	nc	1.1E+01	nc		
Ametryn	5.5E+02	nc	7.9E+03	nc	3.3E+01	nc	3.3E+02	nc		
m-Aminophenol	4.3E+03	nc	6.2E+04	nc	2.6E+02	nc	2.6E+03	nc		
4-Aminopyridine	1.2E+00	nc	1.8E+01	nc	7.3E-02	nc	7.3E-01	nc		
Amitraz	1.5E+02	nc	2.2E+03	nc	9.1E+00	nc	9.1E+01	nc		
Ammonia					1.0E+02	nc				
Ammonium sulfamate	1.2E+04	nc	1.0E+05	max			7.3E+03	nc		
Aniline	8.5E+01	ca**	4.3E+02	ca*	1.0E+00	nc	1.2E+01	ca*		
Antimony and compounds	3.1E+01	nc	8.2E+02	nc			1.5E+01	nc	5.0E+00	3E-01
Antimony pentoxide	*3.9E+01*	*nc*	*1.0E+03*	*nc*			*1.8E+01*	*nc*		
Antimony potassium tartrate	7.0E+01	nc	1.8E+03	nc			3.3E+01	nc		
Antimony tetroxide	3.1E+01	nc	8.2E+02	nc			1.5E+01	nc		
Antimony trioxide	3.1E+01	nc	8.2E+02	nc	2.1E-01	nc	1.5E+01	nc		
Apollo	7.9E+02	nc	1.1E+04	nc	4.7E+01	nc	4.7E+02	nc		
Aramite	1.9E+01	ca	9.9E+01	ca	2.7E-01	ca	2.7E+00	ca		
Arsenic (noncancer endpoint)	2.2E+01	nc	4.4E+02	nc						
Arsenic (cancer endpoint)	3.9E-01	ca*	2.7E+00	ca	4.5E-04	ca	4.5E-02	ca	2.9E+01	1E+00
Arsine (see arsenic for cancer endpoint)					5.2E-02	nc				
Assure	5.5E+02	nc	7.9E+03	nc	3.3E+01	nc	3.3E+02	nc		
Asulam	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
Atrazine	2.2E+00	ca	1.1E+01	ca	3.1E-02	ca	3.0E-01	ca		
Avermectin B1	2.4E+01	nc	3.5E+02	nc	1.5E+00	nc	1.5E+01	nc		
Azobenzene	4.4E+00	ca	2.2E+01	ca	6.2E-02	ca	6.1E-01	ca		
Barium and compounds	5.4E+03	nc	1.0E+05	max	5.2E-01	nc	2.6E+03	nc	1.6E+03	8E+01
Baygon	2.4E+02	nc	3.5E+03	nc	1.5E+01	nc	1.5E+02	nc		
Bayleton	*1.8E+03*	*nc*	*2.6E+04*	*nc*	*1.1E+02*	*nc*	*1.1E+03*	*nc*		
Baythroid	1.5E+03	nc	2.2E+04	nc	9.1E+01	nc	9.1E+02	nc		
Benefin	1.8E+04	nc	1.0E+05	max	1.1E+03	nc	1.1E+04	nc		
Benomyl	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
Bentazon	1.8E+03	nc	2.6E+04	nc	1.1E+02	nc	1.1E+03	nc		
Benzaldehyde	6.1E+03	nc	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc		
Benzene	6.7E-01	ca*	1.5E+00	ca*	2.5E-01	ca*	4.1E-01	ca*	3.0E-02	2E-03
Benzidine	2.1E-03	ca	1.1E-02	ca	2.9E-05	ca	2.9E-04	ca		
Benzoic acid	1.0E+05	max	1.0E+05	max	1.5E+04	nc	1.5E+05	nc	4.0E+02	2E+01
Benzotrichloride	3.7E-02	ca	1.9E-01	ca	5.2E-04	ca	5.2E-03	ca		
Benzyl alcohol	1.8E+04	nc	1.0E+05	max	1.1E+03	nc	1.1E+04	nc		

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FOR PLANNING PURPOSES

TOXICITY INFORMATION											CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS Migration to Ground Water	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)		V O C	skin abs. soils	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
1.7E-01	i			1.7E-01	r			1		100-44-7	Benzyl chloride	8.9E-01	ca	2.3E+00	ca	4.0E-02	ca	6.6E-02	ca		
		2.0E-03	i	8.4E+00	i	5.7E-06	i	0		7440-41-7	Beryllium and compounds	1.5E+02	nc	2.2E+03	ca**	8.0E-04	ca*	7.3E+01	nc	6.3E+01	3E+00
		1.0E-04	i			1.0E-04	r	0	0.10	141-66-2	Bidrin	6.1E+00	nc	8.8E+01	nc	3.7E-01	nc	3.6E+00	nc		
		1.5E-02	i			1.5E-02	r	0	0.10	82657-04-3	Biphenthrin (Talstar)	9.2E+02	nc	1.3E+04	nc	5.5E+01	nc	5.5E+02	nc		
		5.0E-02	i			5.0E-02	r	1		92-52-4	1,1-Biphenyl	3.5E+02	sat	3.5E+02	sat	1.8E+02	nc	3.0E+02	nc		
1.1E+00	i			1.2E+00	i			1		111-44-4	Bis(2-chloroethyl)ether	2.1E-01	ca	6.2E-01	ca	5.8E-03	ca	9.8E-03	ca	4.0E-04	2E-05
7.0E-02	h	4.0E-02	i	3.5E-02	h	4.0E-02	r	1		108-60-1	Bis(2-chloroisopropyl)ether	2.9E+00	ca	8.1E+00	ca	1.9E-01	ca	2.7E-01	ca		
2.2E+02	i			2.2E+02	i			1		542-88-1	Bis(chloromethyl)ether	1.9E-04	ca	4.4E-04	ca	3.1E-05	ca	5.2E-05	ca		
7.0E-02	h			3.5E-02	h			0	0.10	108-60-1	Bis(2-chloro-1-methylethyl)ether	6.9E+00	ca	3.5E+01	ca	1.9E-01	ca	9.6E-01	ca		
1.4E-02	i	2.0E-02	i	1.4E-02	r	2.2E-02	r	0	0.10	117-81-7	Bis(2-ethylhexyl)phthalate (DEHP)	3.5E+01	ca*	1.8E+02	ca	4.8E-01	ca	4.8E+00	ca		
		5.0E-02	i			5.0E-02	r	0	0.10	80-05-7	Bisphenol A	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
		9.0E-02	i			5.7E-03	h	0	0.10	7440-42-8	Boron	5.5E+03	nc	7.9E+04	nc	2.1E+01	nc	3.3E+03	nc		
						2.0E-04	h	0	0.10	7637-07-2	Boron trifluoride					7.3E-01	nc				
		2.0E-02	n			2.9E-03	n	1		108-86-1	Bromobenzene	2.8E+01	nc	9.2E+01	nc	1.0E+01	nc	2.0E+01	nc		
6.2E-02	i	2.0E-02	i	6.2E-02	r	2.0E-02	r	1		75-27-4	Bromodichloromethane	1.0E+00	ca	2.4E+00	ca	1.1E-01	ca	1.8E-01	ca	6E-01	3E-02
7.9E-03	i	2.0E-02	i	3.9E-03	i	2.0E-02	r	0	0.10	75-25-2	Bromoform (tribromomethane)	6.2E+01	ca*	3.1E+02	ca*	1.7E+00	ca*	8.5E+00	ca*	8E-01	4E-02
		1.4E-03	i			1.4E-03	i	1		74-83-9	Bromomethane (Methyl bromide)	3.9E+00	nc	1.3E+01	nc	5.2E+00	nc	8.7E+00	nc	2E-01	1E-02
								0	0.10	101-55-3	4-Bromophenyl phenyl ether										
		5.0E-03	h			5.0E-03	r	0	0.10	2104-96-3	Bromophos	3.1E+02	nc	4.4E+03	nc	1.8E+01	nc	1.8E+02	nc		
		2.0E-02	i			2.0E-02	r	0	0.10	1689-84-5	Bromoxynil	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		2.0E-02	i			2.0E-02	r	0	0.10	1689-99-2	Bromoxynil octanoate	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
1.8E+00	r			1.8E+00	i			1		106-99-0	1,3-Butadiene	3.5E-03	ca	7.6E-03	ca	3.7E-03	ca	6.2E-03	ca		
		1.0E-01	i			1.0E-01	r	0	0.10	71-36-3	1-Butanol	6.1E+03	nc	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc	2E+01	9E-01
		5.0E-02	i			5.0E-02	r	0	0.10	2008-41-5	Butylate	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
		1.0E-02	n			1.0E-02	r	1		104-51-8	n-Butylbenzene	1.4E+02	nc	2.4E+02	sat	3.7E+01	nc	6.1E+01	nc		
		1.0E-02	n			1.0E-02	r	1		135-98-8	sec-Butylbenzene	1.1E+02	nc	2.2E+02	sat	3.7E+01	nc	6.1E+01	nc		
		1.0E-02	n			1.0E-02	r	1		98-06-6	tert-Butylbenzene	1.3E+02	nc	3.9E+02	sat	3.7E+01	nc	6.1E+01	nc		
		2.0E-01	i			2.0E-01	r	0	0.10	85-68-7	Butyl benzyl phthalate	1.2E+04	nc	1.0E+05	max	7.3E+02	nc	7.3E+03	nc	9E+02	8E+02
		1.0E+00	i			1.0E+00	r	0	0.10	85-70-1	Butylphthalyl butylglycolate	6.1E+04	nc	1.0E+05	max	3.7E+03	nc	3.6E+04	nc		
		3.0E-03	h			3.0E-03	r	0	0.10	75-60-5	Cacodylic acid	1.8E+02	nc	2.6E+03	nc	1.1E+01	nc	1.1E+02	nc		
		5.0E-04	i	6.3E+00	i			0	0.001	7440-43-9	Cadmium and compounds	3.7E+01	nc	8.1E+02	nc	1.1E-03	ca	1.8E+01	nc	8E+00	4E-01
											"CAL-Modified PRG" (PEA, 1994)	9.0E+00									
		5.0E-01	i			5.0E-01	r	0	0.10	105-60-2	Caprolactam	3.1E+04	nc	1.0E+05	max	1.8E+03	nc	1.8E+04	nc		
8.6E-03	h	2.0E-03	i	8.6E-03	r	2.0E-03	r	0	0.10	2425-06-1	Captafol	5.7E+01	ca**	2.9E+02	ca**	7.8E-01	ca**	7.8E+00	ca**		
3.5E-03	h	1.3E-01	i	3.5E-03	r	1.3E-01	r	0	0.10	133-06-2	Captan	1.4E+02	ca*	7.0E+02	ca	1.9E+00	ca	1.9E+01	ca		
		1.0E-01	i			1.1E-01	r	0	0.10	63-25-2	Carbaryl	6.1E+03	nc	8.8E+04	nc	4.0E+02	nc	3.6E+03	nc		
2.0E-02	h			2.0E-02	r			0	0.10	86-74-8	Carbazole	2.4E+01	ca	1.2E+02	ca	3.4E-01	ca	3.4E+00	ca	6E-01	3E-02
		5.0E-03	i			5.0E-03	r	0	0.10	1563-66-2	Carbofuran	3.1E+02	nc	4.4E+03	nc	1.8E+01	nc	1.8E+02	nc		
		1.0E-01	i			2.0E-01	i	1		75-15-0	Carbon disulfide	3.6E+02	nc	7.2E+02	sat	7.3E+02	nc	1.0E+03	nc	3E+01	2E+00
1.3E-01	i	7.0E-04	i	5.3E-02	i	7.0E-04	r	1		56-23-5	Carbon tetrachloride	2.4E-01	ca**	5.3E-01	ca*	1.3E-01	ca*	1.7E-01	ca*	7E-02	3E-03
		1.0E-02	i			1.0E-02	r	0	0.10	55285-14-8	Carbosulfan	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
		1.0E-01	i			1.0E-01	r	0	0.10	5234-68-4	Carboxin	6.1E+03	nc	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc		
		2.0E-03	i			2.0E-03	r	0	0.10	302-17-0	Chloral	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
		1.5E-02	i			1.5E-02	r	0	0.10	133-90-4	Chloramben	9.2E+02	nc	1.3E+04	nc	5.5E+01	nc	5.5E+02	nc		
4.0E-01	h			4.0E-01	r			0	0.10	118-75-2	Chloranil	1.2E+00	ca	6.1E+00	ca	1.7E-02	ca	1.7E-01	ca		
3.5E-01	i	5.0E-04	i	3.5E-01	i	2.0E-04	i	0	0.04	12789-03-6	**Chlordane**	1.6E+00	ca*	1.1E+01	ca*	1.9E-02	ca*	1.9E-01	ca*	1E+01	5E-01
		2.0E-02	i			2.0E-02	r	0	0.10	90982-32-4	Chlorimuron-ethyl	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		1.0E-01	i							7782-50-5	Chlorine							3.6E+03	nc		
						5.7E-05	i			10049-04-4	Chlorine dioxide					2.1E-01	nc				
								1		107-20-0	Chloroacetaldehyde										
		2.0E-03	h			2.0E-03	r	0	0.10	79-11-8	Chloroacetic acid	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
		8.6E-06	r			8.6E-06	i	1		532-27-4	2-Chloroacetophenone	3.3E-02	nc	1.1E-01	nc	3.1E-02	nc	5.2E-02	nc		
		4.0E-03	i			4.0E-03	r	0	0.10	106-47-8	4-Chloroaniline	2.4E+02	nc	3.5E+03	nc	1.5E+01	nc	1.5E+02	nc	7E-01	3E-02
		2.0E-02	i			1.7E-02	n	1		108-90-7	**Chlorobenzene**	1.5E+02	nc	5.4E+02	nc	6.2E+01	nc	1.1E+02	nc	1E+00	7E-02
2.7E-01	h	2.0E-02	i	2.7E-01	h	2.0E-02	r	0	0.10	510-15-6	Chlorobenzilate	1.8E+00	ca	9.1E+00	ca	2.5E-02	ca	2.5E-01	ca		
		2.0E-01	h			2.0E-01	r	0	0.10	74-11-3	p-Chlorobenzoic acid	1.2E+04	nc	1.0E+05	max	7.3E+02	nc	7.3E+03	nc		
		2.0E-02	h			2.0E-02	r	0	0.10	98-56-6	4-Chlorobenzotrifluoride	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		2.0E-02	h			2.0E-03	h	1		126-99-8	2-Chloro-1,3-butadiene	3.6E+00	nc	1.2E+01	nc	7.3E+00	nc	1.4E+01	nc		

A-152

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FOR PLANNING PURPOSES

TOXICITY INFORMATION											CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS Migration to Ground Water	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)		VOC	skin abs. soils	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
		4 0E-01	h			4 0E-01	r	1		109 69-3	1-Chlorobutane	4.8E+02	sat	4.8E+02	sat	1.5E+03	nc	2.4E+03	nc		
		1 4E+01	r			1 4E+01	i	1		75-68-3	1-Chloro-1,1-difluoroethane (HCFC-142b)	3.4E+02	sat	3.4E+02	sat	5.2E+04	nc	8.7E+04	nc		
		1 4E+01	r			1 4E+01	i	1		75-45-6	Chlorodifluoromethane	3.4E+02	sat	3.4E+02	sat	5.1E+04	nc	8.5E+04	nc		
2.9E-03	n	4 0E-01	n	2.9E-03	r	2 9E+00	i	1		75-00-3	**Chloroethane**	3.0E+00	ca	6.5E+00	ca	2.3E+00	ca	4.6E+00	ca		
								1		110-75-8	2-Chloroethyl vinyl ether										
6 1E-03	i	1 0E-02	i	8 1E-02	i	8.6E-05	n	1		67-66-3	**Chloroform**	2.4E-01	ca**	5.2E-01	ca**	8.4E-02	ca**	1.6E-01	ca**	6E-01	3E-02
1 3E-02	h			6 3E-03	h	8.6E-02	n	1		74-87-3	**Chloromethane**	1.2E+00	ca	2.7E+00	ca	1.1E+00	ca	1.5E+00	ca		
5 8E-01	h			5 8E-01	r			0	0 10	95 69-2	4-Chloro-2-methylaniline	8.4E-01	ca	4.3E+00	ca	1.2E-02	ca	1.2E-01	ca		
4 6E-01	h			4 6E-01	r			0	0 10	3165 93-3	4-Chloro-2-methylaniline hydrochloride	1.1E+00	ca	5.4E+00	ca	1.5E-02	ca	1.5E-01	ca		
		8 0E-02	i			8 0E-02	r	1		91-58-7	beta-Chloronaphthalene	4.9E+03	nc	2.7E+04	nc	2.9E+02	nc	4.9E+02	nc		
2 5E-02	h			2 5E-02	r		r	1		88-73-3	**o-Chloronitrobenzene**	8.1E+00	ca	2.3E+01	ca	2.7E-01	ca	4.5E-01	ca		
1 8E-02	h			1 8E-02	r		r	1		100-00-5	**p-Chloronitrobenzene**	1.1E+01	ca	3.2E+01	ca	3.7E-01	ca	6.2E-01	ca		
		5 0E-03	i			5 0E 03	r	1		95-57-8	2-Chlorophenol	6.3E+01	nc	2.4E+02	nc	1.8E+01	nc	3.0E+01	nc	4E+00	2E-01
		2 9E-02	r			2 9E-02	h	1		75-29-6	2-Chloropropane	1.7E+02	nc	5.9E+02	nc	1.0E+02	nc	1.7E+02	nc		
1 1E-02	h	1 5E-02	i	1 1E-02	r	1 5E-02	r	0	0 10	1897-45-6	Chlorothalonil	4.4E+01	ca*	2.2E+02	ca*	6.1E-01	ca*	6.1E+00	ca*		
		2 0E-02	i			2 0E-02	r	1		95-49 8	o-Chlorotoluene	1.6E+02	nc	5.7E+02	nc	7.3E+01	nc	1.2E+02	nc		
		2 0E-01	i			2 0E-01	r	0	0 10	101-21-3	Chlorpropham	1.2E+04	nc	1.0E+05	max	7.3E+02	nc	7.3E+03	nc		
		3 0E-03	i			3 0E-03	r	0	0 10	2921-88-2	Chlorpyrifos	1.8E+02	nc	2.6E+03	nc	1.1E+01	nc	1.1E+02	nc		
		1 0E-02	h			1 0E-02	r	0	0 10	5598-13-0	Chlorpyrifos-methyl	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
		5 0E-02	i			5 0E-02	r	0	0 10	64902-72-3	Chlorsulfuron	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
		8 0E-04	h			8 0E-04	r	0	0 10	60238-56-4	Chlorthiophos	4.9E+01	nc	7.0E+02	nc	2.9E+00	nc	2.9E+01	nc		
				4 2E+01	i			0			Total Chromium (1:6 ratio Cr VI:Cr III)	2.1E+02	ca	4.5E+02	ca	1.6E-04	ca			4E+01	2E+00
		1 5E+00	i							16065-83-1	Chromium III	1.0E+05	max	1.0E+05	max			5.5E+04	nc		
		3.0E-03	i	2 9E+02	i			0		18540-29-9	**Chromium VI**	3.0E+01	ca**	6.4E+01	ca	2.3E-05	ca	1.1E+02	nc	4E+01	2E+00
											"CAL-Modified PRG" (PEA, 1994)	2.0E-01						2E-01			
		6 0E-02	n							7440 48-4	Cobalt	4.7E+03	nc	1.0E+05	max			2.2E+03	nc		
				2 2E+00	i			0		8007-45-2	Coke Oven Emissions					3.1E-03	ca				
		3 7E-02	h					0		7440 50 8	Copper and compounds	2.9E+03	nc	7.6E+04	nc			1.4E+03	nc		
1 9E+00	h			1 9E+00	r			1		123-73 9	Crotonaldehyde	5.3E-03	ca	1.1E-02	ca	3.5E-03	ca	5.9E-03	ca		
		1 0E-01	i			1 1E-01	i	1		98 82-8	Cumene (isopropylbenzene)	1.6E+02	nc	5.2E+02	nc	4.0E+02	nc	6.6E+02	nc		
8 4E-01	h	2 0E-03	h	8 4E-01	r	2 0E-03	r	0	0 10	21725 46-2	Cyanazine	5.8E-01	ca	2.9E+00	ca	8.0E-03	ca	8.0E-02	ca		
										n/a	Cyanides										
		1 0E-01	h					0	0 10	542 62-1	Barium cyanide	6.1E+03	nc	1.0E+05	max			3.6E+03	nc		
		4 0E-02	i					0	0 10	592-01-8	Calcium cyanide	2.4E+03	nc	3.5E+04	nc			1.5E+03	nc		
		5 0E-03	i					0	0 10	544-92-3	Copper cyanide	3.1E+02	nc	4.4E+03	nc			1.8E+02	nc		
		2 0E-02	i					0	0 10	57-12-5	Free cyanide	1.2E+03	nc	1.8E+04	nc			7.3E+02	nc	4E+01	2E+00
		2 0E-02	i			8 6E-04	i	1		74-90-8	Hydrogen cyanide	1.1E+01	nc	3.5E+01	nc	3.1E+00	nc	6.2E+00	nc		
		5 0E-02	i					0	0 10	151-50 8	Potassium cyanide	3.1E+03	nc	4.4E+04	nc			1.8E+03	nc		
		2 0E 01	i					0	0 10	506-61-6	Potassium silver cyanide	1.2E+04	nc	1.0E+05	max			7.3E+03	nc		
		1 0E-01	i					0	0 10	506-64-9	Silver cyanide	6.1E+03	nc	8.8E+04	nc			3.6E+03	nc		
		4 0E-02	i					0	0 10	143 33-9	Sodium cyanide	2.4E+03	nc	3.5E+04	nc			1.5E+03	nc		
		5 0E-02	i					0	0 10	557-21-1	Zinc cyanide	3.1E+03	nc	4.4E+04	nc			1.8E+03	nc		
		4 0E-02	i			4 0E-02	r	1		460-19-5	**Cyanogen**	1.3E+02	nc	4.3E+02	nc	1.5E+02	nc	2.4E+02	nc		
		9 0E-02	i			9 0E-02	r	1		506 68-3	**Cyanogen bromide**	2.9E+02	nc	9.7E+02	nc	3.3E+02	nc	5.5E+02	nc		
		5 0E-02	i			5 0E-02	r	1		506-77-4	**Cyanogen chloride**	1.6E+02	nc	5.4E+02	nc	1.8E+02	nc	3.0E+02	nc		
		5 0E+00	i			5 0E+00	r	0	0 10	108-94-1	Cyclohexanone	1.0E+05	max	1.0E+05	max	1.8E+04	nc	1.8E+05	nc		
		2 0E-01	i			2 0E-01	r	0	0 10	108-91-8	Cyclohexylamine	1.2E+04	nc	1.0E+05	max	7.3E+02	nc	7.3E+03	nc		
		5 0E-03	i			5 0E-03	r	0	0 10	68085 85 8	Cyhalothrin/Karate	3.1E+02	nc	4.4E+03	nc	1.8E+01	nc	1.8E+02	nc		
		1 0E-02	i			1 0E-02	r	0	0 10	52315-07-8	Cypermethrin	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
		7 5E-03	i			7.5E-03	r	0	0 10	66215-27-8	Cyromazine	4.6E+02	nc	6.6E+03	nc	2.7E+01	nc	2.7E+02	nc		
		1 0E-02	i			1 0E 02	r	0	0 10	1861-32-1	Dacthal	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
		3 0E-02	i			3 0E 02	r	0	0 10	75-99-0	Dalapon	1.8E+03	nc	2.6E+04	nc	1.1E+02	nc	1.1E+03	nc		
		2 5E 02	i			2 5E-02	r	0	0 10	39515 41-8	Danitol	1.5E+03	nc	2.2E+04	nc	9.1E+01	nc	9.1E+02	nc		
2 4E-01	i			2 4E-01	r			0	0 03	72-54-8	DDD	2.4E+00	ca	1.7E+01	ca	2.8E-02	ca	2.8E-01	ca	2E+01	8E-01
3 4E-01	i			3 4E-01	r			0	0 03	72-55-9	DDE	1.7E+00	ca	1.2E+01	ca	2.0E-02	ca	2.0E-01	ca	5E+01	3E+00
3 4E 01	i	5 0E-04	i	3 4E-01	i	5 0E-04	r	0	0 03	50-29-3	DDT	1.7E+00	ca*	1.2E+01	ca*	2.0E-02	ca*	2.0E-01	ca*	3E+01	2E+00
		1 0E 02	i			1 0E 02	r	0	0 10	1163-19-5	Decabromodiphenyl ether	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
		4 0E-05	i			4 0E-05	r	0	0 10	8065-48-3	Demeton	2.4E+00	nc	3.5E+01	nc	1.5E-01	nc	1.5E+00	nc		

Key : i=IRIS n=NCEA h=HEAST x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION											CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS Migration to Ground Water	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)		VOC	skin abs. soils	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
6.1E-02	h			6.1E-02	r			0	0.10	2303-16-4	Diallate	8.0E+00	ca	4.0E+01	ca	1.1E-01	ca	1.1E+00	ca		
		9.0E-04	h			9.0E-04	r	0	0.10	333-41-5	Diazinon	5.5E+01	nc	7.9E+02	nc	3.3E+00	nc	3.3E+01	nc		
		4.0E-03	x			4.0E-03	r	1		132-64-9	Dibenzofuran	2.9E+02	nc	5.1E+03	nc	1.5E+01	nc	2.4E+01	nc		
		1.0E-02	i			1.0E-02	r	0	0.10	106-37-6	1,4-Dibromobenzene	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
8.4E-02	i	2.0E-02	i	8.4E-02	r	2.0E-02	r	1		124-48-1	**Dibromochloromethane**	1.1E+00	ca	2.7E+00	ca	8.0E-02	ca	1.3E-01	ca	4E-01	2E-02
1.4E+00	h	5.7E-05	r	2.4E-03	h	5.7E-05	i	1		96-12-8	**1,2-Dibromo-3-chloropropane**	4.5E-01	ca**	4.0E+00	ca**	2.1E-01	nc	4.8E-02	ca**		
											"CAL-Modified PRG" (PEA, 1994)	6.0E-02				9.8E-04		4.7E-03			
8.5E+01	i	5.7E-05	r	7.7E-01	i	5.7E-05	h	1		106-93-4	1,2-Dibromoethane	6.9E-03	ca	4.8E-02	ca*	8.7E-03	ca*	7.6E-04	ca		
		1.0E-01	i			1.0E-01	r	0	0.10	84-74-2	Dibutyl phthalate	6.1E+03	nc	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc	2E+03	3E+02
		3.0E-02	i			3.0E-02	r	0	0.10	1918-00-9	Dicamba	1.8E+03	nc	2.6E+04	nc	1.1E+02	nc	1.1E+03	nc		
		9.0E-02	i			5.7E-02	h	1		95-50-1	1,2-Dichlorobenzene	3.7E+02	sat	3.7E+02	sat	2.1E+02	nc	3.7E+02	nc	2E+01	9E-01
		9.00E-04	n			9.00E-04	r	1		541-73-1	**1,3-Dichlorobenzene**	1.3E+01	nc	5.2E+01	nc	3.3E+00	nc	5.5E+00	nc		
2.4E-02	h	3.00E-02	n	2.2E-02	n	3.00E-02	i	1		106-46-7	**1,4-Dichlorobenzene**	3.4E+00	ca	8.1E+00	ca	3.1E-01	ca	5.0E-01	ca	2E+00	1E-01
4.5E-01	i			4.5E-01	r			0	0.10	91-94-1	3,3-Dichlorobenzidine	1.1E+00	ca	5.5E+00	ca	1.5E-02	ca	1.5E-01	ca	7E-03	3E-04
9.3E+00	r			9.3E+00	h			1		764-41-0	1,4-Dichloro-2-butene	7.9E-03	ca	1.8E-02	ca	7.2E-04	ca	1.2E-03	ca		
		2.0E-01	i			5.7E-02	h	1		75-71-8	Dichlorodifluoromethane	9.4E+01	nc	3.1E+02	nc	2.1E+02	nc	3.9E+02	nc		
		1.0E-01	h			1.4E-01	h	1		75-34-3	1,1-Dichloroethane	5.9E+02	nc	2.1E+03	nc	5.2E+02	nc	8.1E+02	nc	2E+01	1E+00
9.1E-02	i	3.0E-02	n	9.1E-02	i	1.4E-03	n	1		107-06-2	1,2-Dichloroethane (EDC)	3.5E-01	ca*	7.6E-01	ca*	7.4E-02	ca*	1.2E-01	ca*	2E-02	1E-03
6.0E-01	i	9.0E-03	i	1.8E-01	i	9.0E-03	r	1		75-35-4	1,1-Dichloroethylene	5.4E-02	ca	1.2E-01	ca	3.8E-02	ca	4.6E-02	ca	6E-02	3E-03
		1.0E-02	h			1.0E-02	r	1		156-59-2	1,2-Dichloroethylene (cis)	4.3E+01	nc	1.5E+02	nc	3.7E+01	nc	6.1E+01	nc	4E-01	2E-02
		2.0E-02	i			2.0E-02	r	1		156-60-5	1,2-Dichloroethylene (trans)	6.3E+01	nc	2.1E+02	nc	7.3E+01	nc	1.2E+02	nc	7E-01	3E-02
		3.0E-03	i			3.0E-03	r	0	0.10	120-83-2	2,4-Dichlorophenol	1.8E+02	nc	2.6E+03	nc	1.1E+01	nc	1.1E+02	nc	1E+00	5E-02
		8.0E-03	i			8.0E-03	r	0	0.10	94-82-6	4-(2,4-Dichlorophenoxy)butyric Acid (2,4-DB)	4.9E+02	nc	7.0E+03	nc	2.9E+01	nc	2.9E+02	nc		
		1.0E-02	i			1.0E-02	r	0	0.05	94-75-7	2,4-Dichlorophenoxyacetic Acid (2,4-D)	6.9E+02	nc	1.2E+04	nc	3.7E+01	nc	3.6E+02	nc		
6.8E-02	h	1.1E-03	r	6.8E-02	r	1.1E-03	i	1		78-87-5	1,2-Dichloropropane	3.5E-01	ca*	7.7E-01	ca*	9.9E-02	ca*	1.6E-01	ca*	3E-02	1E-03
1.8E-01	h	3.0E-04	i	1.3E-01	h	5.7E-03	i	1		542-75-6	1,3-Dichloropropene	8.2E-02	ca	1.8E-01	ca	5.2E-02	ca	8.1E-02	ca	4E-03	2E-04
		3.0E-03	i			3.0E-03	r	0	0.10	616-23-9	2,3-Dichloropropanol	1.8E+02	nc	2.6E+03	nc	1.1E+01	nc	1.1E+02	nc		
2.9E-01	i	5.0E-04	i	2.9E-01	r	1.4E-04	i	0	0.10	62-73-7	Dichlorvos	1.7E+00	ca*	8.5E+00	ca*	2.3E-02	ca*	2.3E-01	ca*		
4.4E-01	x			4.4E-01	r			0	0.10	115-32-2	Dicofol	1.1E+00	ca	5.6E+00	ca	1.5E-02	ca	1.5E-01	ca		
		3.0E-02	h			5.7E-05	h	1		77-73-6	Dicyclopentadiene	5.4E-01	nc	1.8E+00	nc	2.1E-01	nc	4.2E-01	nc		
1.6E+01	i	5.0E-05	i	1.6E+01	i	5.0E-05	r	0	0.10	60-57-1	Dieldrin	3.0E-02	ca	1.5E-01	ca	4.2E-04	ca	4.2E-03	ca	4E-03	2E-04
		5.7E-03	r			5.7E-03	h	0	0.10	112-34-5	Diethylene glycol, monobutyl ether	3.5E+02	nc	5.0E+03	nc	2.1E+01	nc	2.1E+02	nc		
		2.0E+00	h			2.0E+00	r	0	0.10	111-90-0	Diethylene glycol, monoethyl ether	1.0E+05	max	1.0E+05	max	7.3E+03	nc	7.3E+04	nc		
		1.1E-02	h			1.1E-02	r	0	0.10	617-84-5	Diethylformamide	6.7E+02	nc	9.7E+03	nc	4.0E+01	nc	4.0E+02	nc		
1.2E-03	i	6.0E-01	i	1.2E-03	r	6.0E-01	r	0	0.10	103-23-1	Di(2-ethylhexyl)adipate	4.1E+02	ca	2.1E+03	ca	5.6E+00	ca	5.6E+01	ca		
		8.0E-01	i			8.0E-01	r	0	0.10	84-66-2	Diethyl phthalate	4.9E+04	nc	1.0E+05	max	2.9E+03	nc	2.9E+04	nc		
4.7E+03	h			4.7E+03	r			0	0.10	56-53-1	Diethylstilbestrol	1.0E-04	ca	5.2E-04	ca	1.4E-06	ca	1.4E-05	ca		
		8.0E-02	i			8.0E-02	r	0	0.10	43222-48-6	Difenzoquat (Avenge)	4.9E+03	nc	7.0E+04	nc	2.9E+02	nc	2.9E+03	nc		
		2.0E-02	i			2.0E-02	r	0	0.10	35367-38-5	Diflubenzuron	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		1.1E+01	r			1.1E+01	i	1		75-37-6	1,1-Difluoroethane					4.2E+04	nc	6.9E+04	nc		
		8.0E-02	i			8.0E-02	r	0	0.10	1445-75-6	Diisopropyl methylphosphonate	4.9E+03	nc	7.0E+04	nc	2.9E+02	nc	2.9E+03	nc		
		2.0E-02	i			2.0E-02	r	0	0.10	55290-64-7	Dimethipin	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		2.0E-04	i			2.0E-04	r	0	0.10	60-51-5	Dimethoate	1.2E+01	nc	1.8E+02	nc	7.3E-01	nc	7.3E+00	nc		
1.4E-02	h			1.4E-02	r			0	0.10	119-90-4	3,3'-Dimethoxybenzidine	3.5E+01	ca	1.8E+02	ca	4.8E-01	ca	4.8E+00	ca		
		5.7E-06	r			5.7E-06	x	1		124-40-3	Dimethylamine	6.7E-02	nc	2.5E-01	nc	2.1E-02	nc	3.5E-02	nc		
		2.0E-03	i			2.0E-03	r	0	0.10	121-69-7	N-N-Dimethylaniline	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
7.5E-01	h			7.5E-01	r			0	0.10	95-68-1	2,4-Dimethylaniline	6.5E-01	ca	3.3E+00	ca	9.0E-03	ca	9.0E-02	ca		
5.8E-01	h			5.8E-01	r			0	0.10	21436-96-4	2,4-Dimethylaniline hydrochloride	8.4E-01	ca	4.3E+00	ca	1.2E-02	ca	1.2E-01	ca		
9.2E+00	h			9.2E+00	r			0	0.10	119-93-7	3,3'-Dimethylbenzidine	5.3E-02	ca	2.7E-01	ca	7.3E-04	ca	7.3E-03	ca		
2.6E+00	x			3.5E+00	x			0	0.10	57-14-7	1,1-Dimethylhydrazine	1.9E-01	ca	9.5E-01	ca	1.9E-03	ca	2.6E-02	ca		
3.7E+01	x			3.7E+01	x			0	0.10	540-73-8	1,2-Dimethylhydrazine	1.3E-02	ca	6.7E-02	ca	1.8E-04	ca	1.8E-03	ca		
		1.0E-01	h			8.6E-03	i	0	0.10	68-12-2	N,N-Dimethylformamide	6.1E+03	nc	8.8E+04	nc	3.1E+01	nc	3.6E+03	nc		
		1.0E-03	n			1.0E-03	r	0	0.10	122-09-8	Dimethylphenethylamine	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc		
		2.0E-02	i			2.0E-02	r	0	0.10	105-67-9	2,4-Dimethylphenol	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc	9E+00	4E-01
		6.0E-04	i			6.0E-04	r	0	0.10	576-26-1	2,6-Dimethylphenol	3.7E+01	nc	5.3E+02	nc	2.2E+00	nc	2.2E+01	nc		
		1.0E-03	i			1.0E-03	r	0	0.10	95-65-8	3,4-Dimethylphenol	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc		
		1.0E+01	h			1.0E+01	r	0	0.10	131-11-3	Dimethyl phthalate	1.0E+05	max	1.0E+05	max	3.7E+04	nc	3.6E+05	nc		
		1.0E-01	i			1.0E-01	r	0	0.10	120-61-6	Dimethyl terephthalate	6.1E+03	nc	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc		

Key: i=IRIS n=NCEA h=HEAST x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION											CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS Migration to Ground Water	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)		VOC	skin abs. soils	CAS No		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
		2.0E-03	i			2.0E-03	r	0	0.10	131-89-5	4,6-Dinitro-o-cyclohexyl phenol	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
		4.0E-04	h			4.0E-04	r	0	0.10	528-29-0	1,2-Dinitrobenzene	2.4E+01	nc	3.5E+02	nc	1.5E+00	nc	1.5E+01	nc		
		1.0E-04	i			1.0E-04	r	0	0.10	99-65-0	1,3-Dinitrobenzene	6.1E+00	nc	8.8E+01	nc	3.7E-01	nc	3.6E+00	nc		
		4.0E-04	h			4.0E-04	r	0	0.10	100-25-4	1,4-Dinitrobenzene	2.4E+01	nc	3.5E+02	nc	1.5E+00	nc	1.5E+01	nc		
		2.0E-03	i			2.0E-03	r	0	0.10	51-28-5	2,4-Dinitrophenol	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc	3E-01	1E-02
6.8E-01	i			6.8E-01	r			0	0.10	25321-14-6	Dinitrotoluene mixture	7.2E-01	ca	3.6E+00	ca	9.9E-03	ca	9.9E-02	ca	8E-04	4E-05
		2.0E-03	i			2.0E-03	r	0	0.10	121-14-2	2,4-Dinitrotoluene (also see Dinitrotoluene mixture)	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc	8E-04	4E-05
		1.0E-03	h			1.0E-03	r	0	0.10	606-20-2	2,6-Dinitrotoluene (also see Dinitrotoluene mixture)	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc	7E-04	3E-05
		1.0E-03	i			1.0E-03	r	0	0.10	88-85-7	Dinoseb	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc		
		2.0E-02	h			2.0E-02	r	0	0.10	117-84-0	di-n-Octyl phthalate	1.2E+03	nc	1.0E+04	sat	7.3E+01	nc	7.3E+02	nc	1E+04	1E+04
1.1E-02	i			1.1E-02	r			0	0.10	123-91-1	1,4-Dioxane	4.4E+01	ca	2.2E+02	ca	6.1E-01	ca	6.1E+00	ca		
1.5E+05	h			1.5E+05	h			0	0.03	1746-01-6	Dioxin (2,3,7,8-TCDD)	3.9E-06	ca	2.7E-05	ca	4.5E-08	ca	4.5E-07	ca		
		3.0E-02	i			3.0E-02	r	0	0.10	957-51-7	Diphenamid	1.8E+03	nc	2.6E+04	nc	1.1E+02	nc	1.1E+03	nc		
		2.5E-02	i			2.5E-02	r	0	0.10	122-39-4	Diphenylamine	1.5E+03	nc	2.2E+04	nc	9.1E+01	nc	9.1E+02	nc		
8.0E-01	i			7.7E-01	i			0	0.10	122-66-7	1,2-Diphenylhydrazine	6.1E-01	ca	3.1E+00	ca	8.7E-03	ca	8.4E-02	ca		
		9.0E-03	n			9.0E-03	r	0	0.10	127-63-9	Diphenyl sulfone	5.5E+02	nc	7.9E+03	nc	3.3E+01	nc	3.3E+02	nc		
		2.2E-03	i			2.2E-03	r	0	0.10	85-00-7	Diquat	1.3E+02	nc	1.9E+03	nc	8.0E+00	nc	8.0E+01	nc		
8.6E+00	h			8.6E+00	r			0	0.10	1937-37-7	Direct black 38	5.7E-02	ca	2.9E-01	ca	7.8E-04	ca	7.8E-03	ca		
8.1E+00	h			8.1E+00	r			0	0.10	2602-46-2	Direct blue 6	6.0E-02	ca	3.0E-01	ca	8.3E-04	ca	8.3E-03	ca		
9.3E+00	h			9.3E+00	r			0	0.10	16071-86-6	Direct brown 95	5.2E-02	ca	2.7E-01	ca	7.2E-04	ca	7.2E-03	ca		
		4.0E-05	i			4.0E-05	r	0	0.10	298-04-4	Disulfoton	2.4E+00	nc	3.5E+01	nc	1.5E-01	nc	1.5E+00	nc		
		1.0E-02	i			1.0E-02	r	0	0.10	505-29-3	1,4-Dithiane	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
		2.0E-03	i			2.0E-03	r	0	0.10	330-54-1	Diuron	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
		4.0E-03	i			4.0E-03	r	0	0.10	2439-10-3	Dodine	2.4E+02	nc	3.5E+03	nc	1.5E+01	nc	1.5E+02	nc		
		6.0E-03	i			6.0E-03	r	0	0.10	115-29-7	Endosulfan	3.7E+02	nc	5.3E+03	nc	2.2E+01	nc	2.2E+02	nc	2E+01	9E-01
		2.0E-02	i			2.0E-02	r	0	0.10	145-73-3	Endothall	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		3.0E-04	i			3.0E-04	r	0	0.10	72-20-8	Endrin	1.8E+01	nc	2.6E+02	nc	1.1E+00	nc	1.1E+01	nc	1E+00	5E-02
9.9E-03	i	2.0E-03	h	4.2E-03	i	2.9E-04	i	1		106-89-8	Epichlorohydrin	7.6E+00	nc	2.6E+01	nc	1.0E+00	nc	2.0E+00	nc		
		5.7E-03	r			5.7E-03	i	0	0.10	106-88-7	1,2-Epoxybutane	3.5E+02	nc	5.0E+03	nc	2.1E+01	nc	2.1E+02	nc		
		2.5E-02	i			2.5E-02	r	0	0.10	759-94-4	EPTC (S-Ethyl dipropylthiocarbamate)	1.5E+03	nc	2.2E+04	nc	9.1E+01	nc	9.1E+02	nc		
		5.0E-03	i			5.0E-03	r	0	0.10	16672-87-0	Ethephon (2-chloroethyl phosphonic acid)	3.1E+02	nc	4.4E+03	nc	1.8E+01	nc	1.8E+02	nc		
		5.0E-04	i			5.0E-04	r	0	0.10	563-12-2	Ethion	3.1E+01	nc	4.4E+02	nc	1.8E+00	nc	1.8E+01	nc		
		4.0E-01	h			5.7E-02	i	0	0.10	110-80-5	2-Ethoxyethanol	2.4E+04	nc	1.0E+05	max	2.1E+02	nc	1.5E+04	nc		
		3.0E-01	h			3.0E-01	r	0	0.10	111-15-9	2-Ethoxyethanol acetate	1.8E+04	nc	1.0E+05	max	1.1E+03	nc	1.1E+04	nc		
		9.0E-01	i			9.0E-01	r	1		141-78-6	Ethyl acetate	1.9E+04	nc	3.7E+04	sat	3.3E+03	nc	5.5E+03	nc		
4.8E-02	h			4.8E-02	r			1		140-88-5	Ethyl acrylate	2.1E-01	ca	4.5E-01	ca	1.4E-01	ca	2.3E-01	ca		
		1.0E-01	i			2.9E-01	i	1		100-41-4	Ethylbenzene	2.3E+02	sat	2.3E+02	sat	1.1E+03	nc	1.3E+03	nc	1E+01	7E-01
2.9E-03	n	4.0E-01	n	2.9E-03	r	2.9E+00	i	1		75-00-3	**Ethyl chloride**	3.0E+00	ca	6.5E+00	ca	2.3E+00	ca	4.6E+00	ca		
		3.0E-01	h			3.0E-01	r	0	0.10	109-78-4	Ethylene cyanohydrin	1.8E+04	nc	1.0E+05	max	1.1E+03	nc	1.1E+04	nc		
		2.0E-02	h			2.0E-02	r	0	0.10	107-15-3	Ethylene diamine	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		2.0E+00	i			2.0E+00	r	0	0.10	107-21-1	Ethylene glycol	1.0E+05	max	1.0E+05	max	7.3E+03	nc	7.3E+04	nc		
		5.7E-03	r			5.7E-03	h	0	0.10	111-76-2	Ethylene glycol, monobutyl ether	3.5E+02	nc	5.0E+03	nc	2.1E+01	nc	2.1E+02	nc		
1.0E+00	h			3.5E-01	h			1		75-21-8	Ethylene oxide	1.4E-01	ca	3.6E-01	ca	1.9E-02	ca	2.4E-02	ca		
1.1E-01	h	8.0E-05	i	1.1E-01	r	8.0E-05	r	0	0.10	96-45-7	Ethylene thiourea (ETU)	4.4E+00	ca**	2.2E+01	ca**	6.1E-02	ca**	6.1E-01	ca**		
		2.0E-01	i			2.0E-01	r	1		60-29-7	Ethyl ether	1.8E+03	sat	1.8E+03	sat	7.3E+02	nc	1.2E+03	nc		
		9.0E-02	h			9.0E-02	r	1		97-63-2	Ethyl methacrylate	1.4E+02	sat	1.4E+02	sat	3.3E+02	nc	5.5E+02	nc		
		1.0E-05	i			1.0E-05	r	0	0.10	2104-64-5	Ethyl p-nitrophenyl phenylphosphorothioate	6.1E-01	nc	8.8E+00	nc	3.7E-02	nc	3.6E-01	nc		
		3.0E+00	i			3.0E+00	r	0	0.10	84-72-0	Ethylphthalyl ethyl glycolate	1.0E+05	max	1.0E+05	max	1.1E+04	nc	1.1E+05	nc		
		8.0E-03	i			8.0E-03	r	0	0.10	101200-48-0	Express	4.9E+02	nc	7.0E+03	nc	2.9E+01	nc	2.9E+02	nc		
		2.5E-04	i			2.5E-04	r	0	0.10	22224-92-6	Fenamiphos	1.5E+01	nc	2.2E+02	nc	9.1E-01	nc	9.1E+00	nc		
		1.3E-02	i			1.3E-02	r	0	0.10	2164-17-2	Fluometuron	7.9E+02	nc	1.1E+04	nc	4.7E+01	nc	4.7E+02	nc		
		6.0E-02	i					0	0.10	16984-48-8	Flouride	3.7E+03	nc	5.3E+04	nc			2.2E+03	nc		
		8.0E-02	i			8.0E-02	r	0	0.10	59756-60-4	Fluoridone	4.9E+03	nc	7.0E+04	nc	2.9E+02	nc	2.9E+03	nc		
		2.0E-02	i			2.0E-02	r	0	0.10	56425-91-3	Flurprimidol	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		6.0E-02	i			6.0E-02	r	0	0.10	66332-96-5	Flutolanil	3.7E+03	nc	5.3E+04	nc	2.2E+02	nc	2.2E+03	nc		
		1.0E-02	i			1.0E-02	r	0	0.10	69409-94-5	Fluvalinate	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
3.5E-03	i	1.0E-01	i	3.5E-03	r	1.0E-01	r	0	0.10	133-07-3	Folpet	1.4E+02	ca*	7.0E+02	ca	1.9E+00	ca	1.9E+01	ca		
1.9E-01	i			1.9E-01	r			0	0.10	72178-02-0	Fomesafen	2.6E+00	ca	1.3E+01	ca	3.5E-02	ca	3.5E-01	ca		

A-155

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FOR PLANNING PURPOSES

TOXICITY INFORMATION											CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS Migration to Ground Water	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)		VOC	skin abs. soils	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
		2.0E-03	i			2.0E-03	r	0	0.10	944-22-9	Fonofos	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
		1.5E-01	i	4.6E-02	i			0	0.10	50-00-0	Formaldehyde	9.2E+03	nc	1.0E+05	nc	1.5E-01	ca	5.5E+03	nc		
		2.0E+00	h			2.0E+00	r	0	0.10	64-18-6	Formic Acid	1.0E+05	max	1.0E+05	max	7.3E+03	nc	7.3E+04	nc		
		3.0E+00	i			3.0E+00	r	0	0.10	39148-24-8	Fosetyl-al	1.0E+05	max	1.0E+05	max	1.1E+04	nc	1.1E+05	nc		
		1.0E-03	i			1.0E-03	r	1		110-00-9	Furan	2.5E+00	nc	8.5E+00	nc	3.7E+00	nc	6.1E+00	nc		
3.8E+00	h			3.8E+00	r			0	0.10	67-45-8	Furazolidone	1.3E-01	ca	6.5E-01	ca	1.8E-03	ca	1.8E-02	ca		
		3.0E-03	i			1.4E-02	h	0	0.10	98-01-1	Furfural	1.8E+02	nc	2.6E+03	nc	5.2E+01	nc	1.1E+02	nc		
5.0E+01	h			5.0E+01	r			0	0.10	531-82-8	Furium	9.7E-03	ca	4.9E-02	ca	1.3E-04	ca	1.3E-03	ca		
3.0E-02	i			3.0E-02	r			0	0.10	60568-05-0	Furmecyclox	1.6E+01	ca	8.2E+01	ca	2.2E-01	ca	2.2E+00	ca		
		4.0E-04	i			4.0E-04	r	0	0.10	77182-82-2	Glufosinate-ammonium	2.4E+01	nc	3.5E+02	nc	1.5E+00	nc	1.5E+01	nc		
		4.0E-04	i			2.9E-04	h	0	0.10	765-34-4	Glycidaldehyde	2.4E+01	nc	3.5E+02	nc	1.0E+00	nc	1.5E+01	nc		
		1.0E-01	i			1.0E-01	r	0	0.10	1071-83-6	Glyphosate	6.1E+03	nc	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc		
		5.0E-05	i			5.0E-05	r	0	0.10	69806-40-2	Haloxyfop-methyl	3.1E+00	nc	4.4E+01	nc	1.8E-01	nc	1.8E+00	nc		
		1.3E-02	i			1.3E-02	r	0	0.10	79277-27-3	Harmony	7.9E+02	nc	1.1E+04	nc	4.7E+01	nc	4.7E+02	nc		
4.5E+00	i	5.0E-04	i	4.6E+00	i	5.0E-04	r	0	0.10	76-44-8	Heptachlor	1.1E-01	ca	5.5E-01	ca	1.5E-03	ca	1.5E-02	ca	2E+01	1E+00
9.1E+00	i	1.3E-05	i	9.1E+00	i	1.3E-05	r	0	0.10	1024-57-3	Heptachlor epoxide	5.3E-02	ca*	2.7E-01	ca*	7.4E-04	ca*	7.4E-03	ca*	7E-01	3E-02
		2.0E-03	i			2.0E-03	r	0	0.10	87-82-1	Hexabromobenzene	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
1.6E+00	i	8.0E-04	i	1.6E+00	i	8.0E-04	r	0	0.10	118-74-1	Hexachlorobenzene	3.0E-01	ca	1.5E+00	ca	4.2E-03	ca	4.2E-02	ca	2E+00	1E-01
7.8E-02	i	2.0E-04	h	7.8E-02	i	2.0E-04	r	0	0.10	87-68-3	Hexachlorobutadiene	6.2E+00	ca**	3.2E+01	ca**	8.6E-02	ca**	8.6E-01	ca**	2E+00	1E-01
6.3E+00	i			6.3E+00	i			0	0.04	319-84-6	HCH (alpha)	9.0E-02	ca	5.9E-01	ca	1.1E-03	ca	1.1E-02	ca	5E-04	3E-05
1.8E+00	i			1.8E+00	i			0	0.04	319-85-7	HCH (beta)	3.2E-01	ca	2.1E+00	ca	3.7E-03	ca	3.7E-02	ca	3E-03	1E-04
1.3E+00	h	3.0E-04	i	1.3E+00	r	3.0E-04	r	0	0.04	58-89-9	HCH (gamma) Lindane	4.4E-01	ca*	2.9E+00	ca	5.2E-03	ca	5.2E-02	ca	9E-03	5E-04
1.8E+00	i			1.8E+00	i			0	0.04	608-73-1	HCH-technical	3.2E-01	ca	2.1E+00	ca	3.8E-03	ca	3.7E-02	ca	3E-03	1E-04
		7.0E-03	i			2.0E-05	h	0	0.10	77-47-4	Hexachlorocyclopentadiene	4.2E+02	nc	5.9E+03	nc	7.3E-02	nc	2.6E+02	nc	4E+02	2E+01
6.2E+03	i			4.6E+03	i			0	0.10	19408-74-3	Hexachlorodibenzo-p-dioxin mixture (HxCDD)	7.8E-05	ca	4.0E-04	ca	1.5E-06	ca	1.1E-05	ca		
1.4E-02	i	1.0E-03	i	1.4E-02	i	1.0E-03	r	0	0.10	67-72-1	Hexachloroethane	3.5E+01	ca**	1.8E+02	ca**	4.8E-01	ca**	4.8E+00	ca**	5E-01	2E-02
		3.0E-04	i			3.0E-04	r	0	0.10	70-30-4	Hexachlorophene	1.8E+01	nc	2.6E+02	nc	1.1E+00	nc	1.1E+01	nc		
1.1E-01	i	3.0E-03	i	1.1E-01	r	3.0E-03	r	0	0.10	121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	4.4E+00	ca*	2.2E+01	ca	6.1E-02	ca	6.1E-01	ca		
		2.9E-06	r			2.9E-06	i	0	0.10	822-06-0	1,6-Hexamethylene diisocyanate	1.7E-01	nc	2.5E+00	nc	1.0E-02	nc	1.0E-01	nc		
		6.0E-02	h			5.7E-02	i	1		110-54-3	n-Hexane	1.1E+02	sat	1.1E+02	sat	2.1E+02	nc	3.5E+02	nc		
		3.3E-02	i			3.3E-02	r	0	0.10	51235-04-2	Hexazinone	2.0E+03	nc	2.9E+04	nc	1.2E+02	nc	1.2E+03	nc		
3.0E+00	i			1.7E+01	i			0	0.10	302-01-2	Hydrazine, hydrazine sulfate	1.6E-01	ca	8.2E-01	ca	3.9E-04	ca	2.2E-02	ca		
						5.7E-03	i			7647-01-0	Hydrogen chloride					2.1E+01	nc				
		3.0E-03	i			2.9E-04	i			7783-06-4	Hydrogen sulfide					1.0E+00	nc	1.1E+02	nc		
		4.0E-02	h			4.0E-02	r	0	0.10	123-31-9	p-Hydroquinone	2.4E+03	nc	3.5E+04	nc	1.5E+02	nc	1.5E+03	nc		
		1.3E-02	i			1.3E-02	r	0	0.10	35554-44-0	Imazalil	7.9E+02	nc	1.1E+04	nc	4.7E+01	nc	4.7E+02	nc		
		2.5E-01	i			2.5E-01	r	0	0.10	81335-37-7	Imazaquin	1.5E+04	nc	1.0E+05	max	9.1E+02	nc	9.1E+03	nc		
		4.0E-02	i			4.0E-02	r	0	0.10	36734-19-7	Iprodione	2.4E+03	nc	3.5E+04	nc	1.5E+02	nc	1.5E+03	nc		
		3.0E-01	n					0		7439-89-6	Iron	2.3E+04	nc	1.0E+05	max			1.1E+04	nc		
		3.0E-01	i			3.0E-01	r	1		78-83-1	Isobutanol	1.3E+04	nc	4.0E+04	sat	1.1E+03	nc	1.8E+03	nc		
9.5E-04	i	2.0E-01	i	9.5E-04	r	2.0E-01	r	0	0.10	78-59-1	Isophorone	5.1E+02	ca*	2.6E+03	ca*	7.1E+00	ca	7.1E+01	ca	5E-01	3E-02
		1.5E-02	i			1.5E-02	r	0	0.10	33820-53-0	Isopropalin	9.2E+02	nc	1.3E+04	nc	5.5E+01	nc	5.5E+02	nc		
		1.0E-01	i			1.1E-01	r	0	0.10	1832-54-8	Isopropyl methyl phosphonic acid	6.1E+03	nc	8.8E+04	nc	4.0E+02	nc	3.6E+03	nc		
		5.0E-02	i			5.0E-02	r	0	0.10	82558-50-7	Isoxaben	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
1.8E+01	n			1.8E+01	r			0	0.10	143-50-0	Kepone	2.7E-02	ca	1.4E-01	ca	3.7E-04	ca	3.7E-03	ca		
		2.0E-03	i			2.0E-03	r	0	0.10	77501-63-4	Lactofen	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
PRGs Based on EPA Models, IEUBK (1994) and TRW (1996)										7439-92-1	Lead	4.0E+02	nc	1.0E+03	nc						
		1.0E-07	i					0	0.10	78-00-2	Lead (tetraethyl)	6.1E-03	nc	8.8E-02	nc			3.6E-03	nc		
		2.0E-03	i			2.0E-03	r	0	0.10	330-55-2	Linuron	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
		2.0E-02	x					0		7439-93-2	Lithium	1.6E+03	nc	4.1E+04	nc			7.3E+02	nc		
		2.0E-01	i			2.0E-01	r	0	0.10	83055-99-6	Londax	1.2E+04	nc	1.0E+05	max	7.3E+02	nc	7.3E+03	nc		
		2.0E-02	i			2.0E-02	r	0	0.10	121-75-5	Malathion	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		1.0E-01	i			1.0E-01	r	0	0.10	108-31-6	Maleic anhydride	6.1E+03	nc	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc		
		5.0E-01	i			5.0E-01	r	1		123-33-1	Maleic hydrazide	1.7E+03	nc	2.4E+03	sat	1.8E+03	nc	3.0E+03	nc		
		2.0E-05	h			2.0E-05	r	0	0.10	109-77-3	Malononitrile	1.2E+00	nc	1.8E+01	nc	7.3E-02	nc	7.3E-01	nc		
		3.0E-02	h			3.0E-02	r	0	0.10	8018-01-7	Mancozeb	1.8E+03	nc	2.6E+04	nc	1.1E+02	nc	1.1E+03	nc		
6.0E-02	o	5.0E-03	i	6.0E-02	r	5.0E-03	r	0	0.10	12427-38-2	Maneb	8.1E+00	ca*	4.1E+01	ca	1.1E-01	ca	1.1E+00	ca		
		2.4E-02	i			1.4E-05	i	0		7439-96-5	Manganese and compounds	1.8E+03	nc	3.2E+04	nc	5.1E-02	nc	8.8E+02	nc		

Key : I=IRIS n=NCEA h=HEAST x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION											CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS Migration to Ground Water	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)		VOC	skin abs. soils	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
		9.0E-05	h			9.0E-05	r	0	0.10	950-10-7	Mephosfolan	5.5E+00	nc	7.9E+01	nc	3.3E-01	nc	3.3E+00	nc		
		3.0E-02	i			3.0E-02	r	0	0.10	24307-26-4	Mepiquat	1.8E+03	nc	2.6E+04	nc	1.1E+02	nc	1.1E+03	nc		
2.9E-02	n	1.0E-01	n	2.9E-02	r	1.0E-01	r	0	0.10	149-30-4	2-Mercaptobenzothiazole	1.7E+01	ca	8.5E+01	ca	2.3E-01	ca	2.3E+00	ca		
		3.0E-04	i					0		7487-94-7	Mercury and compounds	2.3E+01	nc	6.1E+02	nc			1.1E+01	nc		
						8.6E-05	i			7439-97-6	Mercury (elemental)					3.1E-01	nc				
		1.0E-04	i					0	0.10	22967-92-6	Mercury (methyl)	6.1E+00	nc	8.8E+01	nc			3.6E+00	nc		
		3.0E-05	i			3.0E-05	r	0	0.10	150-50-5	Merphos	1.8E+00	nc	2.6E+01	nc	1.1E-01	nc	1.1E+00	nc		
		3.0E-05	i			3.0E-05	r	0	0.10	78-48-8	Merphos oxide	1.8E+00	nc	2.6E+01	nc	1.1E-01	nc	1.1E+00	nc		
		6.0E-02	i			6.0E-02	r	0	0.10	57837-19-1	Metalaxyl	3.7E+03	nc	5.3E+04	nc	2.2E+02	nc	2.2E+03	nc		
		1.0E-04	i			2.0E-04	h	1		126-98-7	Methacrylonitrile	2.1E+00	nc	8.8E+00	nc	7.3E-01	nc	1.0E+00	nc		
		5.0E-05	i			5.0E-05	r	0	0.10	10265-92-6	Methamidophos	3.1E+00	nc	4.4E+01	nc	1.8E-01	nc	1.8E+00	nc		
		5.0E-01	i			5.0E-01	r	0	0.10	67-56-1	Methanol	3.1E+04	nc	1.0E+05	max	1.8E+03	nc	1.8E+04	nc		
		1.0E-03	i			1.0E-03	r	0	0.10	950-37-8	Methidathion	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc		
		2.5E-02	i			2.5E-02	r	1		16752-77-5	Methomyl	4.4E+01	nc	1.5E+02	nc	9.1E+01	nc	1.5E+02	nc		
		5.0E-03	i			5.0E-03	r	0	0.10	72-43-5	Methoxychlor	3.1E+02	nc	4.4E+03	nc	1.8E+01	nc	1.8E+02	nc	2E+02	8E+00
		1.0E-03	h			5.7E-03	i	0	0.10	109-86-4	2-Methoxyethanol	6.1E+01	nc	8.8E+02	nc	2.1E+01	nc	3.6E+01	nc		
		2.0E-03	h			2.0E-03	r	0	0.10	110-49-6	2-Methoxyethanol acetate	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
4.6E-02	h			4.6E-02	r			0	0.10	99-59-2	2-Methoxy-5-nitroaniline	1.1E+01	ca	5.4E+01	ca	1.5E-01	ca	1.5E+00	ca		
		1.0E+00	h			1.0E+00	r	1		79-20-9	Methyl acetate	2.2E+04	nc	9.6E+04	nc	3.7E+03	nc	6.1E+03	nc		
		3.0E-02	h			3.0E-02	r	1		96-33-3	Methyl acrylate	7.0E+01	nc	2.3E+02	nc	1.1E+02	nc	1.8E+02	nc		
2.4E-01	h			2.4E-01	r			0	0.10	95-53-4	2-Methylaniline (o-toluidine)	2.0E+00	ca	1.0E+01	ca	2.8E-02	ca	2.8E-01	ca		
1.8E-01	h			1.8E-01	r			0	0.10	636-21-5	2-Methylaniline hydrochloride	2.7E+00	ca	1.4E+01	ca	3.7E-02	ca	3.7E-01	ca		
		1.0E+00	x			1.0E+00	r	0	0.10	79-22-1	Methyl chlorocarbonate	6.1E+04	nc	1.0E+05	max	3.7E+03	nc	3.6E+04	nc		
		5.0E-04	i			5.0E-04	r	0	0.10	94-74-6	2-Methyl-4-chlorophenoxyacetic acid	3.1E+01	nc	4.4E+02	nc	1.8E+00	nc	1.8E+01	nc		
		1.0E-02	i			1.0E-02	r	0	0.10	94-81-5	4-(2-Methyl-4-chlorophenoxy) butyric acid	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
		1.0E-03	i			1.0E-03	r	0	0.10	93-65-2	2-(2-Methyl-4-chlorophenoxy) propionic acid	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc		
		1.0E-03	i			1.0E-03	r	0	0.10	16484-77-8	2-(2-Methyl-1,4-chlorophenoxy) propionic acid	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc		
		8.6E-01	r			8.6E-01	h	1		108-87-2	Methylcyclohexane	2.6E+03	nc	8.8E+03	nc	3.1E+03	nc	5.2E+03	nc		
2.5E-01	h			2.5E-01	r			0	0.10	101-77-9	4,4'-Methylenebisbenzeneamine	1.9E+00	ca	9.9E+00	ca	2.7E-02	ca	2.7E-01	ca		
1.3E-01	h	7.0E-04	h	1.3E-01	h	7.0E-04	r	0	0.10	101-14-4	4,4'-Methylene bis(2-chloroaniline)	3.7E+00	ca*	1.9E+01	ca*	5.2E-02	ca*	5.2E-01	ca*		
4.6E-02	i			4.6E-02	r			0	0.10	101-61-1	4,4'-Methylene bis(N,N'-dimethyl)aniline	1.1E+01	ca	5.4E+01	ca	1.5E-01	ca	1.5E+00	ca		
		1.0E-02	h			1.0E-02	r	1		74-95-3	Methylene bromide	6.7E+01	nc	2.4E+02	nc	3.7E+01	nc	6.1E+01	nc		
7.5E-03	i	6.0E-02	i	1.6E-03	i	8.6E-01	h	1		75-09-2	Methylene chloride	8.9E+00	ca	2.1E+01	ca	4.1E+00	ca	4.3E+00	ca	2E-02	1E-03
		1.7E-04	r			1.7E-04	i	0	0.10	101-68-8	4,4'-Methylene diphenyl diisocyanate	1.0E+01	nc	1.5E+02	nc	6.2E-01	nc	6.2E+00	nc		
		6.0E-01	i			2.9E-01	i	1		78-93-3	Methyl ethyl ketone	7.3E+03	nc	2.8E+04	nc	1.0E+03	nc	1.9E+03	nc		
1.1E+00	h			1.1E+00	r			0	0.10	60-34-4	Methyl hydrazine	4.4E-01	ca	2.2E+00	ca	6.1E-03	ca	6.1E-02	ca		
		8.0E-02	h			2.3E-02	h	1		108-10-1	Methyl isobutyl ketone	7.9E+02	nc	2.9E+03	nc	8.3E+01	nc	1.6E+02	nc		
		5.7E-04	r			5.7E-04	n	0	0.10	74-93-1	Methyl Mercaptan	3.5E+01	nc	5.0E+02	nc	2.1E+00	nc	2.1E+01	nc		
		1.4E+00	i			2.0E-01	i	1		80-62-6	Methyl methacrylate	2.2E+03	nc	2.7E+03	sat	7.3E+02	nc	1.4E+03	nc		
3.3E-02	h			3.3E-02	r			0	0.10	99-55-8	2-Methyl-5-nitroaniline	1.5E+01	ca	7.5E+01	ca	2.0E-01	ca	2.0E+00	ca		
		2.5E-04	i			2.5E-04	r	0	0.10	298-00-0	Methyl parathion	1.5E+01	nc	2.2E+02	nc	9.1E-01	nc	9.1E+00	nc		
		5.0E-02	i			5.0E-02	r	0	0.10	95-48-7	2-Methylphenol	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc	2E+01	8E-01
		5.0E-02	i			5.0E-02	r	0	0.10	108-39-4	3-Methylphenol	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
		5.0E-03	h			5.0E-03	r	0	0.10	106-44-5	4-Methylphenol	3.1E+02	nc	4.4E+03	nc	1.8E+01	nc	1.8E+02	nc		
		2.0E-02	n			2.0E-02	r	0	0.10	993-13-5	Methyl phosphonic acid	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		6.0E-03	h			1.1E-02	h	1		25013-15-4	Methyl styrene (mixture)	1.3E+02	nc	5.6E+02	nc	4.2E+01	nc	6.0E+01	nc		
		7.0E-02	h			7.0E-02	r	1		98-83-9	Methyl styrene (alpha)	6.8E+02	sat	6.8E+02	sat	2.6E+02	nc	4.3E+02	nc		
						8.6E-01	i	1		1634-04-4	Methyl tertbutyl ether (MTBE)					3.1E+03	nc	2.0E+01	nc/ca		
		1.5E-01	i			1.5E-01	r	0	0.10	51218-45-2	Metolaclor (Dual)	9.2E+03	nc	1.0E+05	max	5.5E+02	nc	5.5E+03	nc		
		2.5E-02	i			2.5E-02	r	0	0.10	21087-64-9	Metribuzin	1.5E+03	nc	2.2E+04	nc	9.1E+01	nc	9.1E+02	nc		
1.8E+00	x	2.0E-04	i	1.8E+00	r	2.0E-04	r	0	0.10	2385-85-5	Mirex	2.7E-01	ca*	1.4E+00	ca	3.7E-03	ca	3.7E-02	ca		
		2.0E-03	i			2.0E-03	r	0	0.10	2212-67-1	Molinate	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
		5.0E-03	h					0		7439-98-7	Molybdenum	3.9E+02	nc	1.0E+04	nc			1.8E+02	nc		
		1.0E-01	h			1.0E-01	h	0	0.10	10599-90-3	Monochloramine	6.1E+03	nc	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc		
		2.0E-03	i			2.0E-03	r	0	0.10	300-76-5	Naled	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
		1.0E-01	i			1.0E-01	r	0	0.10	15299-99-7	Napropamide	6.1E+03	nc	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc		
		2.0E-02	i					0		7440-02-0	Nickel (soluble salts)	1.6E+03	nc	4.1E+04	nc			7.3E+02	nc	1E+02	7E+00
											"CAL-Modified PRG" (PEA, 1994)	1.5E+02									

Key : I=IRIS n=NCEA h=HEAST x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)		VOC	skin abs. soils	CAS No.	CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs) Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		SOIL SCREENING LEVELS Migration to Ground Water DAF 20 (mg/kg)	DAF 1 (mg/kg)
				8.4E-01	i			0			Nickel refinery dust					8.0E-03	ca				
				1.7E+00	i			0		12035-72-2	Nickel subsulfide			1.1E+04	ca	4.0E-03	ca				
		1.5E-03	x			1.5E-03	r	0	0.10	1929-82-4	Nitrapyrin	9.2E+01	nc	1.3E+03	nc	5.5E+00	nc	5.5E+01	nc		
Tap Water PRG Based on Infant NOAEL (see IRIS)										14797-55-8	Nitrate							1.0E+04	nc		
		1.0E-01	x							10102-43-9	Nitric Oxide	7.8E+03	nc	1.0E+05	max			3.6E+03	nc		
Tap Water PRG Based on Infant NOAEL (see IRIS)										14797-65-0	Nitrite							1.0E+03	nc		
		5.7E-05	r			5.7E-05	h	0	0.10	88-74-4	2-Nitroaniline	3.5E+00	nc	5.0E+01	nc	2.1E-01	nc	2.1E+00	nc		
		5.0E-04	i			5.7E-04	h	1		98-95-3	Nitrobenzene	2.0E+01	nc	1.1E+02	nc	2.1E+00	nc	3.4E+00	nc	1E-01	7E-03
		7.0E-02	h			7.0E-02	r	0	0.10	67-20-9	Nitrofurantoin	4.3E+03	nc	6.2E+04	nc	2.6E+02	nc	2.6E+03	nc		
1.5E+00	h			9.4E+00	h			0	0.10	59-87-0	Nitrofurazone	3.2E-01	ca	1.6E+00	ca	7.2E-04	ca	4.5E-02	ca		
1.4E-02	n			1.4E-02	r			0	0.10	55-63-0	Nitroglycerin	3.5E+01	ca	1.8E+02	ca	4.8E-01	ca	4.8E+00	ca		
		1.0E-01	i			1.0E-01	r	0	0.10	556-88-7	Nitroguanidine	6.1E+03	nc	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc		
		8.0E-03	n			8.00E-03	r	0	0.10	100-02-7	4-Nitrophenol	4.9E+02	nc	7.0E+03	nc	2.9E+01	nc	2.9E+02	nc		
9.4E+00	r	5.7E-03	r	9.4E+00	h	5.7E-03	i	1		79-46-9	2-Nitropropane					7.2E-04	ca	1.2E-03	ca		
5.4E+00	i			5.6E+00	i			1		924-16-3	N-Nitrosodi-n-butylamine	2.4E-02	ca	6.1E-02	ca	1.2E-03	ca	2.0E-03	ca		
2.8E+00	i			2.8E+00	r			0	0.10	1116-54-7	N-Nitrosodiethanolamine	1.7E-01	ca	8.8E-01	ca	2.4E-03	ca	2.4E-02	ca		
1.5E+02	i			1.5E+02	i			0	0.10	55-18-5	N-Nitrosodiethylamine	3.2E-03	ca	1.6E-02	ca	4.5E-05	ca	4.5E-04	ca		
5.1E+01	i			4.9E+01	i			0	0.10	62-75-9	N-Nitrosodimethylamine	9.5E-03	ca	4.8E-02	ca	1.4E-04	ca	1.3E-03	ca		
4.9E-03	i			4.9E-03	r			0	0.10	86-30-6	N-Nitrosodiphenylamine	9.9E+01	ca	5.0E+02	ca	1.4E+00	ca	1.4E+01	ca	1E+00	6E-02
7.0E+00	i			7.0E+00	r			0	0.10	621-64-7	N-Nitroso di-n-propylamine	6.9E-02	ca	3.5E-01	ca	9.6E-04	ca	9.6E-03	ca	5E-05	2E-06
2.2E+01	i			2.2E+01	r			0	0.10	10595-95-6	N-Nitroso-N-methylethylamine	2.2E-02	ca	1.1E-01	ca	3.1E-04	ca	3.1E-03	ca		
2.1E+00	i			2.1E+00	i			0	0.10	930-55-2	N-Nitrosopyrrolidine	2.3E-01	ca	1.2E+00	ca	3.1E-03	ca	3.2E-02	ca		
		1.0E-02	h			1.0E-02	r	1		99-08-1	m-Nitrotoluene	3.7E+02	nc	1.00E+03	sat	3.7E+01	nc	6.1E+01	nc		
		1.0E-02	h			1.0E-02	r	1		99-08-1	o-Nitrotoluene	3.7E+02	nc	1.00E+03	sat	3.7E+01	nc	6.1E+01	nc		
		1.0E-02	h			1.0E-02	r	1		99-99-0	p-Nitrotoluene	3.7E+02	nc	1.00E+03	sat	3.7E+01	nc	6.1E+01	nc		
		4.0E-02	i			4.0E-02	r	0	0.10	27314-13-2	Norflurazon	2.4E+03	nc	3.5E+04	nc	1.5E+02	nc	1.5E+03	nc		
		7.0E-04	i			7.0E-04	r	0	0.10	85509-19-9	NuStar	4.3E+01	nc	6.2E+02	nc	2.6E+00	nc	2.6E+01	nc		
		3.0E-03	i			3.0E-03	r	0	0.10	32536-52-0	Octabromodiphenyl ether	1.8E+02	nc	2.6E+03	nc	1.1E+01	nc	1.1E+02	nc		
		5.0E-02	i			5.0E-02	r	0	0.10	2691-41-0	Octahydro-1357-tetranitro-1357- tetrazocine (HMX)	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
		2.0E-03	h			2.0E-03	r	0	0.10	152-16-9	Octamethylpyrophosphoramide	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
		5.0E-02	i			5.0E-02	r	0	0.10	19044-88-3	Oryzalin	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
		5.0E-03	i			5.0E-03	r	0	0.10	19666-30-9	Oxadiazon	3.1E+02	nc	4.4E+03	nc	1.8E+01	nc	1.8E+02	nc		
		2.5E-02	i			2.5E-02	r	0	0.10	23135-22-0	Oxamyl	1.5E+03	nc	2.2E+04	nc	9.1E+01	nc	9.1E+02	nc		
		3.0E-03	i			3.0E-03	r	0	0.10	42874-03-3	Oxyfluorfen	1.8E+02	nc	2.6E+03	nc	1.1E+01	nc	1.1E+02	nc		
		1.3E-02	i			1.3E-02	r	0	0.10	76738-62-0	Paclobutrazol	7.9E+02	nc	1.1E+04	nc	4.7E+01	nc	4.7E+02	nc		
		4.5E-03	i			4.5E-03	r	0	0.10	4685-14-7	Paraquat	2.7E+02	nc	4.0E+03	nc	1.6E+01	nc	1.6E+02	nc		
		6.0E-03	h			6.0E-03	r	0	0.10	56-38-2	Parathion	3.7E+02	nc	5.3E+03	nc	2.2E+01	nc	2.2E+02	nc		
		5.0E-02	h			5.0E-02	r	0	0.10	1114-71-2	Pebulate	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
		4.0E-02	i			4.0E-02	r	0	0.10	40487-42-1	Pendimethalin	2.4E+03	nc	3.5E+04	nc	1.5E+02	nc	1.5E+03	nc		
2.3E-02	h			2.3E-02	r			0	0.10	87-84-3	Pentabromo-6-chloro cyclohexane	2.1E+01	ca	1.1E+02	ca	2.9E-01	ca	2.9E+00	ca		
		2.0E-03	i			2.0E-03	r	0	0.10	32534-81-9	Pentabromodiphenyl ether	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
		8.0E-04	i			8.0E-04	r	0	0.10	608-93-5	Pentachlorobenzene	4.9E+01	nc	7.0E+02	nc	2.9E+00	nc	2.9E+01	nc		
2.6E-01	h	3.0E-03	i	2.6E-01	r	3.0E-03	r	0	0.10	82-68-8	Pentachloronitrobenzene	1.9E+00	ca*	9.5E+00	ca	2.6E-02	ca	2.6E-01	ca		
1.2E-01	i	3.0E-02	i	1.2E-01	r	3.0E-02	r	0	0.25	87-86-5	Pentachlorophenol	3.0E+00	ca	1.1E+01	ca	5.6E-02	ca	5.6E-01	ca	3E-02	1E-03
		5.0E-04	x					0		7601-90-3	Perchlorate	3.9E+01	nc	1.0E+03	nc			1.8E+01	nc		
		5.0E-02	i			5.0E-02	r	0	0.10	52645-53-1	Permethrin	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
		2.5E-01	i			2.5E-01	r	0	0.10	13684-63-4	Phenmedipham	1.5E+04	nc	1.0E+05	max	9.1E+02	nc	9.1E+03	nc		
		6.0E-01	i			6.0E-01	r	0	0.10	108-95-2	Phenol	3.7E+04	nc	1.0E+05	max	2.2E+03	nc	2.2E+04	nc	1E+02	5E+00
		2.0E-03	n			2.0E-03	r	0	0.10	92-84-2	Phenothiazine	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
		6.0E-03	i			6.0E-03	r	0	0.10	108-45-2	m-Phenylenediamine	3.7E+02	nc	5.3E+03	nc	2.2E+01	nc	2.2E+02	nc		
		1.9E-01	h			1.9E-01	r	0	0.10	106-50-3	p-Phenylenediamine	1.2E+04	nc	1.0E+05	max	6.9E+02	nc	6.9E+03	nc		
		8.0E-05	i			8.0E-05	r	0	0.10	62-38-4	Phenylmercuric acetate	4.9E+00	nc	7.0E+01	nc	2.9E-01	nc	2.9E+00	nc		
1.9E-03	h			1.9E-03	r			0	0.10	90-43-7	2-Phenylphenol	2.5E+02	ca	1.3E+03	ca	3.5E+00	ca	3.5E+01	ca		
		2.0E-04	h			2.0E-04	r	0	0.10	298-02-2	Phorate	1.2E+01	nc	1.8E+02	nc	7.3E-01	nc	7.3E+00	nc		
		2.0E-02	i			2.0E-02	r	0	0.10	732-11-6	Phosmet	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		3.0E-04	h			8.6E-05	i	0	0.10	7803-51-2	Phosphine	1.8E+01	nc	2.6E+02	nc	3.1E-01	nc	1.1E+01	nc		
						2.9E-03	i			7664-38-2	Phosphoric acid					1.0E+01	nc				
		2.0E-05	i					0		7723-14-0	Phosphorus (white)	1.6E+00	nc	4.1E+01	nc			7.3E-01	nc		

A-158

Key : i=IRIS n=NCEA h=HEAST x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION											CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS Migration to Ground Water	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)		VOC	skin abs. soils	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
		1.0E+00	h			1.0E+00	r	0	0.10	100-21-0	p-Phthalic acid	6.1E+04	nc	1.0E+05	max	3.7E+03	nc	3.6E+04	nc		
		2.0E+00	i			3.4E-02	h	0	0.10	85-44-9	Phthalic anhydride	1.0E+05	max	1.0E+05	max	1.2E+02	nc	7.3E+04	nc		
		7.0E-02	i			7.0E-02	r	0	0.10	1918-02-1	Picloram	4.3E+03	nc	6.2E+04	nc	2.6E+02	nc	2.6E+03	nc		
		1.0E-02	i			1.0E-02	r	0	0.10	23505-41-1	Pirimiphos-methyl	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
8.9E+00	h	7.0E-06	h	8.9E+00	r	7.0E-06	r	0	0.10		Polybrominated biphenyls	5.5E-02	ca**	2.8E-01	ca*	7.6E-04	ca*	7.6E-03	ca*		
2.0E+00	i			2.0E+00	i			0	0.14	1336-36-3	Polychlorinated biphenyls (PCBs)	2.2E-01	ca	1.0E+00	ca	3.4E-03	ca	3.4E-02	ca		
7.0E-02	i	7.0E-05	i	7.0E-02	i	7.0E-05	r	0	0.14	12674-11-2	**Aroclor 1016**	3.9E+00	nc	2.9E+01	ca**	9.6E-02	ca**	9.6E-01	ca**		
2.0E+00	i			2.0E+00	i			0	0.14	11104-28-2	**Aroclor 1221**	2.2E-01	ca	1.0E+00	ca	3.4E-03	ca	3.4E-02	ca		
2.0E+00	i			2.0E+00	i			0	0.14	11141-16-5	**Aroclor 1232**	2.2E-01	ca	1.0E+00	ca	3.4E-03	ca	3.4E-02	ca		
2.0E+00	i			2.0E+00	i			0	0.14	53469-21-9	**Aroclor 1242**	2.2E-01	ca	1.0E+00	ca	3.4E-03	ca	3.4E-02	ca		
2.0E+00	i			2.0E+00	i			0	0.14	12672-29-6	**Aroclor 1248**	2.2E-01	ca	1.0E+00	ca	3.4E-03	ca	3.4E-02	ca		
2.0E+00	i	2.0E-05	i	2.0E+00	i	2.0E-05	r	0	0.14	11097-69-1	**Aroclor 1254**	2.2E-01	ca**	1.0E+00	ca*	3.4E-03	ca*	3.4E-02	ca*		
2.0E+00	i			2.0E+00	i			0	0.14	11096-82-5	**Aroclor 1260**	2.2E-01	ca	1.0E+00	ca	3.4E-03	ca	3.4E-02	ca		
									0.13		*Polynuclear aromatic hydrocarbons (PAHs)*										
		6.0E-02	i			6.0E-02	r	1		83-32-9	Acenaphthene	3.7E+03	nc	3.8E+04	nc	2.2E+02	nc	3.7E+02	nc	6E+02	3E+01
		3.0E-01	i			3.0E-01	r	1		120-12-7	Anthracene	2.2E+04	nc	1.0E+05	max	1.1E+03	nc	1.8E+03	nc	1E+04	6E+02
7.3E-01	n			3.1E-01	n			0	0.13	56-55-3	Benz[a]anthracene	6.2E-01	ca	2.9E+00	ca	2.2E-02	ca	9.2E-02	ca	2E+00	8E-02
7.3E-01	n			3.1E-01	n			0	0.13	205-99-2	Benzo[b]fluoranthene	6.2E-01	ca	2.9E+00	ca	2.2E-02	ca	9.2E-02	ca	5E+00	2E-01
7.3E-02	n			3.1E-02	n			0	0.13	207-08-9	Benzo[k]fluoranthene	6.2E+00	ca	2.9E+01	ca	2.2E-01	ca	9.2E-01	ca	5E+01	2E+00
											"CAL-Modified PRG" (PEA, 1994)	6.1E-01									
7.3E+00	i			3.1E+00	n			0	0.13	50-32-8	Benzo[a]pyrene	6.2E-02	ca	2.9E-01	ca	2.2E-03	ca	9.2E-03	ca	8E+00	4E-01
											"CAL-Modified PRG" (PEA, 1994)							1.5E-03			
7.3E-03	n			3.1E-03	n			0	0.13	218-01-9	Chrysene	6.2E+01	ca	2.9E+02	ca	2.2E+00	ca	9.2E+00	ca	2E+02	8E+00
											"CAL-Modified PRG" (PEA, 1994)	6.1E+00									
7.3E+00	n			3.1E+00	n			0	0.13	53-70-3	*Dibenz[ah]anthracene*	6.2E-02	ca	2.9E-01	ca	2.2E-03	ca	9.2E-03	ca	2E+00	8E-02
		4.0E-02	i			4.0E-02	r	0	0.13	206-44-0	Fluoranthene	2.3E+03	nc	3.0E+04	nc	1.5E+02	nc	1.5E+03	nc	4E+03	2E+02
		4.0E-02	i			4.0E-02	r	1		86-73-7	Fluorene	2.6E+03	nc	3.3E+04	nc	1.5E+02	nc	2.4E+02	nc	6E+02	3E+01
7.3E-01	n			3.1E-01	n			0	0.13	193-39-5	Indeno[1,2,3-cd]pyrene	6.2E-01	ca	2.9E+00	ca	2.2E-02	ca	9.2E-02	ca	1E+01	7E-01
		2.0E-02	i			8.6E-04	i	1		91-20-3	Naphthalene	5.6E+01	nc	1.9E+02	nc	3.1E+00	nc	6.2E+00	nc	8E+01	4E+00
		3.0E-02	i			3.0E-02	r	1		129-00-0	Pyrene	2.3E+03	nc	5.4E+04	nc	1.1E+02	nc	1.8E+02	nc	4E+03	2E+02
1.5E-01	i	9.0E-03	i	1.5E-01	r	9.0E-03	r	0	0.10	67747-09-5	Prochloraz	3.2E+00	ca	1.6E+01	ca	4.5E-02	ca	4.5E-01	ca		
		6.0E-03	h			6.0E-03	r	0	0.10	26399-36-0	Profluralin	3.7E+02	nc	5.3E+03	nc	2.2E+01	nc	2.2E+02	nc		
		1.5E-02	i			1.5E-02	r	0	0.10	1610-18-0	Prometon	9.2E+02	nc	1.3E+04	nc	5.5E+01	nc	5.5E+02	nc		
		4.0E-03	i			4.0E-03	r	0	0.10	7287-19-6	Prometryn	2.4E+02	nc	3.5E+03	nc	1.5E+01	nc	1.5E+02	nc		
		7.5E-02	i			7.5E-02	r	0	0.10	23950-58-5	Pronamide	4.6E+03	nc	6.6E+04	nc	2.7E+02	nc	2.7E+03	nc		
		1.3E-02	i			1.3E-02	r	0	0.10	1918-16-7	Propachlor	7.9E+02	nc	1.1E+04	nc	4.7E+01	nc	4.7E+02	nc		
		5.0E-03	i			5.0E-03	r	0	0.10	709-98-8	Propanil	3.1E+02	nc	4.4E+03	nc	1.8E+01	nc	1.8E+02	nc		
		2.0E-02	i			2.0E-02	r	0	0.10	2312-35-8	Propargite	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		2.0E-03	i			2.0E-03	r	0	0.10	107-19-7	Propargyl alcohol	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
		2.0E-02	i			2.0E-02	r	0	0.10	139-40-2	Propazine	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		2.0E-02	i			2.0E-02	r	0	0.10	122-42-9	Propham	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		1.3E-02	i			1.3E-02	r	0	0.10	60207-90-1	Propiconazole	7.9E+02	nc	1.1E+04	nc	4.7E+01	nc	4.7E+02	nc		
		1.0E-01	i			1.1E-01	i	1		98-82-8	Isopropylbenzene (Cumene)	1.6E+02	nc	5.2E+02	nc	4.0E+02	nc	6.6E+02	nc		
		1.0E-02	n			1.0E-02	r	1		103-65-1	n-Propylbenzene	1.4E+02	nc	2.4E+02	sat	3.7E+01	nc	6.1E+01	nc		
		2.0E+01	h			2.0E+01	r	0	0.10	57-55-6	Propylene glycol	1.0E+05	max	1.0E+05	max	7.3E+04	nc	7.3E+05	nc		
		7.0E-01	h			7.0E-01	r	0	0.10	111-35-3	Propylene glycol, monoethyl ether	4.3E+04	nc	1.0E+05	max	2.6E+03	nc	2.6E+04	nc		
		7.0E-01	h			5.7E-01	i	0	0.10	107-98-2	Propylene glycol, monomethyl ether	4.3E+04	nc	1.0E+05	max	2.1E+03	nc	2.6E+04	nc		
2.4E-01	i	8.6E-03	r	1.3E-02	i	8.6E-03	i	1		75-56-9	Propylene oxide	1.9E+00	ca*	9.1E+00	ca*	5.2E-01	ca*	2.2E-01	ca		
		2.5E-01	i			2.5E-01	r	0	0.10	81335-77-5	Pursuit	1.5E+04	nc	1.0E+05	max	9.1E+02	nc	9.1E+03	nc		
		2.5E-02	i			2.5E-02	r	0	0.10	51630-58-1	Pydrin	1.5E+03	nc	2.2E+04	nc	9.1E+01	nc	9.1E+02	nc		
		1.0E-03	i			1.0E-03	r	0	0.10	110-86-1	Pyridine	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc		
		5.0E-04	i			5.0E-04	r	0	0.10	13593-03-8	Quinalphos	3.1E+01	nc	4.4E+02	nc	1.8E+00	nc	1.8E+01	nc		
1.2E+01	h			1.2E+01	r			0	0.10	91-22-5	Quinoline	4.1E-02	ca	2.1E-01	ca	5.6E-04	ca	5.6E-03	ca		
1.1E-01	i	3.0E-03	i	1.1E-01	r	3.0E-03	r	0	0.10	121-82-4	RDX (Cyclonite)	4.4E+00	ca*	2.2E+01	ca	6.1E-02	ca	6.1E-01	ca		
		3.0E-02	i			3.0E-02	r	0	0.10	10453-86-8	Resmethrin	1.8E+03	nc	2.6E+04	nc	1.1E+02	nc	1.1E+03	nc		
		5.0E-02	h			5.0E-02	r	0	0.10	299-84-3	Ronnel	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
		4.0E-03	i			4.0E-03	r	0	0.10	83-79-4	Rotenone	2.4E+02	nc	3.5E+03	nc	1.5E+01	nc	1.5E+02	nc		
		2.5E-02	i			2.5E-02	r	0	0.10	78587-05-0	Savey	1.5E+03	nc	2.2E+04	nc	9.1E+01	nc	9.1E+02	nc		

Key : i=IRIS n=NCEA h=HEAST x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where. nc < 100X ca) **(where. nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION											CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS Migration to Ground Water	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)		V O C	skin abs. soils	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
		5 0E-03	i					0	0 10	7783 00 8	Selenious Acid	3.1E+02	nc	4.4E+03	nc			1.8E+02	nc		
		5 0E-03	i					0		7782-49-2	Selenium	3.9E+02	nc	1.0E+04	nc			1.8E+02	nc	5E+00	3E-01
		5 0E-03	h					0	0 10	630-10 4	Selenourea	3.1E+02	nc	4.4E+03	nc			1.8E+02	nc		
		9 0E-02	i			9 0E-02	r	0	0 10	74051-80-2	Sethoxydim	5.5E+03	nc	7.9E+04	nc	3.3E+02	nc	3.3E+03	nc		
		5 0E-03	i					0		7440 22 4	Silver and compounds	3.9E+02	nc	1.0E+04	nc			1.8E+02	nc	3E+01	2E+00
1 2E-01	h	5 0E-03	i	1 2E-01	r	2 0E-03	r	0	0 10	122-34-9	Simazine	4.1E+00	ca*	2.1E+01	ca	5.6E-02	ca	5.6E-01	ca		
		4 0E-03	i			4 0E-03	r	0	0 10	26628-22-8	Sodium azide	2.4E+02	nc	3.5E+03	nc	1.5E+01	nc	1.5E+02	nc		
2 7E-01	h	3 0E-02	i	2 7E-01	r	3 0E-02	r	0	0 10	148-18 5	Sodium diethyldithiocarbamate	1.8E+00	ca	9.1E+00	ca	2.5E-02	ca	2.5E-01	ca		
		2 0E-05	i			2 0E-05	r	0	0 10	62-74-8	Sodium fluoroacetate	1.2E+00	nc	1.8E+01	nc	7.3E-02	nc	7.3E-01	nc		
		1 0E-03	h			1 0E-03	r	0	0 10	13718-26-8	Sodium metavanadate	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc		
		6 0E-01	i					0		7440-24-6	Strontium, stable	4.7E+04	nc	1.0E+05	max			2.2E+04	nc		
		3 0E-04	i			3 0E-04	r	0	0 10	57-24-9	Strychnine	1.8E+01	nc	2.6E+02	nc	1.1E+00	nc	1.1E+01	nc		
		2 0E-01	i			2 9E-01	i	1		100-42-5	Styrene	1.7E+03	sat	1.7E+03	sat	1.1E+03	nc	1.6E+03	nc	4E+00	2E-01
		2 5E-02	i			2 5E-02	r	0	0 10	88671-89-0	Systhane	1.5E+03	nc	2.2E+04	nc	9.1E+01	nc	9.1E+02	nc		
1 5E+05	h			1 5E+05	h			0	0 03	1746-01-6	2,3,7,8-TCDD (dioxin)	3.9E-06	ca	2.7E-05	ca	4.5E-08	ca	4.5E-07	ca		
		7.0E-02	i			7 0E-02	r	0	0 10	34014-18-1	Tebuthiuron	4.3E+03	nc	6.2E+04	nc	2.6E+02	nc	2.6E+03	nc		
		2 0E-02	h			2 0E-02	r	0	0 10	3383-96 8	Temephos	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		1 3E-02	i			1 3E-02	r	0	0 10	5902-51-2	Terbacil	7.9E+02	nc	1.1E+04	nc	4.7E+01	nc	4.7E+02	nc		
		2 5E-05	h			2 5E-05	r	0	0 10	13071-79-9	Terbufos	1.5E+00	nc	2.2E+01	nc	9.1E-02	nc	9.1E-01	nc		
		1 0E 03	i			1 0E-03	r	0	0 10	886-50-0	Terbutryn	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc		
		3 0E-04	i			3 0E-04	r	0	0 10	95-94-3	1,2,4,5-Tetrachlorobenzene	1.8E+01	nc	2.6E+02	nc	1.1E+00	nc	1.1E+01	nc		
2 6E-02	i	3 0E-02	i	2 6E-02	i	3 0E-02	r	1		630-20-6	1,1,1,2-Tetrachloroethane	3.0E+00	ca	7.0E+00	ca	2.6E-01	ca	4.3E-01	ca		
2 0E-01	i	6.00E-02	n	2 0E-01	i	6.00E-02	r	1		79-34-5	**1,1,2,2-Tetrachloroethane**	3.8E-01	ca	9.0E-01	ca	3.3E-02	ca	5.5E-02	ca	3E-03	2E-04
5 2E-02	n	1 0E-02	i	2 0E-03	n	1 1E-01	n	1		127-18-4	Tetrachloroethylene (PCE)	5.7E+00	ca*	1.9E+01	ca*	3.3E+00	ca	1.1E+00	ca	6E-02	3E-03
											"CAL-Modified PRG" (PEA, 1994)					3.2E-01					
		3 0E-02	i			3 0E-02	r	0	0 10	58 90-2	2,3,4,6-Tetrachlorophenol	1.8E+03	nc	2.6E+04	nc	1.1E+02	nc	1.1E+03	nc		
2 0E+01	h			2 0E+01	r			0	0 10	5216-25-1	p,a,a,a-Tetrachlorotoluene	2.4E-02	ca	1.2E-01	ca	3.4E-04	ca	3.4E-03	ca		
2 4E-02	h	3 0E-02	i	2 4E-02	r	3 0E-02	r	0	0 10	961-11-5	Tetrachlorovinphos	2.0E+01	ca*	1.0E+02	ca	2.8E-01	ca	2.8E+00	ca		
		5 0E-04	i			5 0E-04	r	0	0 10	3689-24-5	Tetraethyldithiopyrophosphate	3.1E+01	nc	4.4E+02	nc	1.8E+00	nc	1.8E+01	nc		
7.6E-03	n	**2.1E-01**	n	**6.6E-03**	n	6 6E-02	n	0	0 10	109-99-9	**Tetrahydrofuran**	6.4E+01	ca	3.2E+02	ca	9.9E-01	ca	8.8E+00	ca		
		7 0E-05	x					0		1314-32-5	Thallic oxide	5.5E+00	nc	1.4E+02	nc			2.6E+00	nc		
		9 0E-05	i					0		563 68-8	*Thallium acetate*	7.0E+00	nc	1.8E+02	nc			3.3E+00	nc	7E-01	4E-01
		8 0E-05	i					0		6533-73-9	Thallium carbonate	6.3E+00	nc	1.6E+02	nc			2.9E+00	nc	7E-01	4E-01
		8 0E-05	i					0		7791 12-0	Thallium chloride	6.3E+00	nc	1.6E+02	nc			2.9E+00	nc	7E-01	4E-01
		9 0E-05	i					0		10102-45-1	Thallium nitrate	7.0E+00	nc	1.8E+02	nc			3.3E+00	nc	7E-01	4E-01
		9 0E-05	x					0		12039-52-0	Thallium selenite	7.0E+00	nc	1.8E+02	nc			3.3E+00	nc	7E-01	4E-01
		8 0E-05	i					0		7446-18-6	Thallium sulfate	6.3E+00	nc	1.6E+02	nc			2.9E+00	nc	7E-01	4E-01
		1 0E-02	i			1 0E-02	r	0	0 10	28249-77-6	Thiobencarb	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
		1 0E-01	n			1 0E-01	r	0	0 10	N/A	Thiocyanate	6.1E+03	nc	1.0E+05	max	3.7E+02	nc	3.6E+03	nc		
		3 0E-04	h			3 0E-04	r	0	0 10	39196-18-4	Thiofanox	1.8E+01	nc	2.6E+02	nc	1.1E+00	nc	1.1E+01	nc		
		8 0E-02	i			8 0E-02	r	0	0 10	23564-05-8	Thiophanate-methyl	4.9E+03	nc	7.0E+04	nc	2.9E+02	nc	2.9E+03	nc		
		5 0E-03	i			5 0E-03	r	0	0 10	137-26-8	Thiram	3.1E+02	nc	4.4E+03	nc	1.8E+01	nc	1.8E+02	nc		
		6 0E-01	h					0			Tin (inorganic, see tributyltin oxide for organic tin)	4.7E+04	nc	1.0E+05	max			2.2E+04	nc		
		2 0E 01	i			1 1E-01	h	1		108-88-3	Toluene	5.2E+02	sat	5.2E+02	sat	4.0E+02	nc	7.2E+02	nc	1E+01	6E-01
3 2E+00	h			3 2E+00	r			0	0 10	95-80-7	Toluene-2,4-diamine	1.5E-01	ca	7.7E-01	ca	2.1E-03	ca	2.1E-02	ca		
		6 0E-01	h			6 0E-01	r	0	0 10	95-70-5	Toluene-2,5-diamine	3.7E+04	nc	1.0E+05	max	2.2E+03	nc	2.2E+04	nc		
		2 0E-01	h			2 0E-01	r	0	0 10	823 40 5	Toluene-2,6-diamine	1.2E+04	nc	1.0E+05	max	7.3E+02	nc	7.3E+03	nc		
2E-01	i			2E-01	r			0	0.10	106 49-0	p-Toluidine	2.6E+00	ca	1.3E+01	ca	3.5E-02	ca	3.5E-01	ca		
1 1E+00	i			1 1E+00	i			0	0 10	8001 35-2	Toxaphene	4.4E-01	ca	2.2E+00	ca	6.0E-03	ca	6.1E-02	ca	3E+01	2E+00
		7 5E 03	i			7 5E-03	r	0	0 10	66841-25 6	Tralomethrin	4.6E+02	nc	6.6E+03	nc	2.7E+01	nc	2.7E+02	nc		
		1 3E-02	i			1 3E-02	r	0	0 10	2303-17-5	Triallate	7.9E+02	nc	1.1E+04	nc	4.7E+01	nc	4.7E+02	nc		
		1 0E-02	i			1 0E-02	r	0	0 10	82097-50-5	Triasulfuron	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
		5 0E-03	i			5 0E-03	r	0	0 10	615-54-3	1,2,4-Tribromobenzene	3.1E+02	nc	4.4E+03	nc	1.8E+01	nc	1.8E+02	nc		
		3 0E-04	i					0	0 10	56-35-9	Tributyltin oxide (TBTO)	1.8E+01	nc	2.6E+02	nc			1.1E+01	nc		
3 4E-02	h			3 4E-02	r			0	0 10	634 93 5	2,4,6-Trichloroaniline	1.4E+01	ca	7.3E+01	ca	2.0E-01	ca	2.0E+00	ca		
2 9E-02	h			2 9E-02	r			0	0 10	33663 50 2	2,4,6-Trichloroaniline hydrochloride	1.7E+01	ca	8.5E+01	ca	2.3E-01	ca	2.3E+00	ca		
		1 0E-02	i			5 7E-02	h	1		120-82-1	1,2,4-Trichlorobenzene	6.5E+02	nc	3.00E+03	sat	2.1E+02	nc	1.9E+02	nc	5E+00	3E-01
		3 5E-02	n			2 9E-01	n	1		71-55 6	1,1,1-Trichloroethane	7.7E+02	nc	1.4E+03	sat	1.0E+03	nc	7.9E+02	nc	2E+00	1E[illegible]

A-160

A-161

Key: I=IRIS n=NCEA h=HEAST x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION											CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS Migration to Ground Water	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)		VOC	skin abs. soils	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
5 7E-02	i	4 0E-03	i	5 6E-02	i	4 0E-03	r	1		79 00 5	1,1,2-Trichloroethane	8.4E-01	ca*	1.9E+00	ca*	1.2E-01	ca	2.0E-01	ca	2E-02	9E-04
1 1E-02	n	6 0E-03	x	6 0E-03	n	6 0E 03	r	1		79-01-6	Trichloroethylene (TCE)	2.8E+00	ca**	6.1E+00	ca*	1.1E+00	ca*	1.6E+00	ca*	6E-02	3E-03
		3 0E-01	i			2 0E 01	h	1		75 69 4	Trichlorofluoromethane	3.9E+02	nc	2.00E+03	sat	7.3E+02	nc	1.3E+03	nc		
		1 0E-01	i			1 0E-01	r	0	0 10	95 95 4	2,4,5-Trichlorophenol	6.1E+03	nc	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc	3E+02	1E+01
1 1E-02	i			1 1E-02	i			0	0 10	88-06-2	2,4,6-Trichlorophenol	4.4E+01	ca	2.2E+02	ca	6.2E-01	ca	6.1E+00	ca	2E-01	8E-03
		1 0E-02	i			1 0E-02	r	0	0 10	93-76-5	2,4,5-Trichlorophenoxyacetic Acid	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
		8 0E-03	i			8 0E-03	r	0	0 10	93-72-1	2-(2,4,5-Trichlorophenoxy) propionic acid	4.9E+02	nc	7.0E+03	nc	2.9E+01	nc	2.9E+02	nc		
		5 0E-03	i			5 0E-03	r	1		598-77-6	1,1,2-Trichloropropane	1.5E+01	nc	5.1E+01	nc	1.8E+01	nc	3.0E+01	nc		
7 0E+00	h	6 0E-03	i	7 0E+00	r	5 0E-03	r	1		96-18-4	1,2,3-Trichloropropane	1.4E-03	ca	3.1E-03	ca	9.6E-04	ca	1.6E-03	ca		
		5 0E-03	h			5 0E-03	r	1		96-19-5	1,2,3-Trichloropropene	1.2E+01	nc	3.9E+01	nc	1.8E+01	nc	3.0E+01	nc		
		3 0E+01	i			8 6E+00	h	1		76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.6E+03	sat	5.6E+03	sat	3.1E+04	nc	5.9E+04	nc		
		3 0E-03	i			3 0E-03	r	0	0 10	58138-08-2	Tridiphane	1.8E+02	nc	2.6E+03	nc	1.1E+01	nc	1.1E+02	nc		
		2 0E-03	r			2 0E-03	i	1		121-44-8	Triethylamine	2.3E+01	nc	8.8E+01	nc	7.3E+00	nc	1.2E+01	nc		
7 7E-03	i	7 5E-03	i	7 7E-03	r	7 5E-03	r	0	0 10	1582-09-8	Trifluralin	6.3E+01	ca**	3.2E+02	ca*	8.7E-01	ca*	8.7E+00	ca*		
		5 0E-02	n			1 7E-03	n	1		95 63 6	1,2,4-Trimethylbenzene	5.7E+00	sat	5.7E+00	sat	6.2E+00	nc	1.2E+01	nc		
		5 0E-02	n			1 7E-03	n	1		108 67-8	1,3,5-Trimethylbenzene	2.1E+01	nc	7.0E+01	nc	6.2E+00	nc	1.2E+01	nc		
3 7E-02	h			3 7E-02	r			0	0 10	512-56-1	Trimethyl phosphate	1.3E+01	ca	6.7E+01	ca	1.8E-01	ca	1.8E+00	ca		
		3 0E-02	i			3 0E-02	r	0	0 10	99 35 4	1,3,5-Trinitrobenzene	1.8E+03	nc	2.6E+04	nc	1.1E+02	nc	1.1E+03	nc		
		1 0E-02	h			1 0E-02	r	0	0 10	479 45-8	Trinitrophenylmethylnitramine	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
3E-02	i	5 0E-04	i	3E-02	r	5 0E-04	r	0	0 10	118-96-7	2,4,6-Trinitrotoluene	1.6E+01	ca**	8.2E+01	ca**	2.2E-01	ca**	2.2E+00	ca**		
		7 0E-03	h					0		7440 62 2	Vanadium	5.5E+02	nc	1.4E+04	nc			2.6E+02	nc	6E+03	3E+02
		9 0E-03	i					0		1314-62-1	Vanadium pentoxide	7.0E+02	nc	1.8E+04	nc			3.3E+02	nc	6E+03	3E+02
		2 0E-02	h					0		13701-70-7	Vanadium sulfate	1.6E+03	nc	4.1E+04	nc			7.3E+02	nc	6E+03	3E+02
		1 0E-03	i			1 0E-03	r	0	0 10	1929-77-7	Vernam	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc		
		2 5E-02	i			2 5E-02	r	0	0 10	50471-44-8	Vinclozolin	1.5E+03	nc	2.2E+04	nc	9.1E+01	nc	9.1E+02	nc		
		1 0E+00	h			5 7E-02	r	1		108-05 4	Vinyl acetate	4.3E+02	nc	1.4E+03	nc	2.1E+02	nc	4.1E+02	nc	2E+02	8E+00
1 1E-01	r	8 6E-04	r	1 1E-01	h	8 6E-04	r	1		593 60-2	Vinyl bromide (bromoethene)	1.9E-01	ca*	4.2E-01	ca*	6.1E-02	ca*	1.0E-01	ca*		
1 9E+00	h			3 0E-01	h			1		75-01-4	Vinyl chloride	2.2E-02	ca	4.9E-02	ca	2.2E-02	ca	2.0E-02	ca	1E-02	7E-04
		3 0E-04	i			3 0E-04	r	0	0 10	81-81-2	Warfarin	1.8E+01	nc	2.6E+02	nc	1.1E+00	nc	1.1E+01	nc		
		2 0E+00	i			2 0E-01	x	1	0 10	1330-20-7	Xylenes	2.1E+02	sat	2.1E+02	sat	7.3E+02	nc	1.4E+03	nc	2E+02	1E+01
		3 0E-01	i					0		7440-66-6	Zinc	2.3E+04	nc	1.0E+05	max			1.1E+04	nc	1E+04	6E+02
		3 0E-04	i					0		1314-84-7	Zinc phosphide	2.3E+01	nc	6.1E+02	nc			1.1E+01	nc		
		5 0E-02	i			5 0E-02	r	0	0 10	12122-67-7	Zineb	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		

APPENDIX D

USEPA REGION 3 RISK-BASED CONCENTRATIONS

Sources: I = IRIS H = HEAST A = HEAST Alternate W = Withdrawn from IRIS or HEAST
E = EPA NCEA provisional value O = other

Basis: C = Carcinogenic effects N = Noncarcinogenic effects I = RBC at HI of 0.1 < RBC-c

Chemical	CAS	RfDo mg/kg/d	CSFo 1/mg/kg/d	RfDi mg/kg/d	CSFi 1/mg/kg/d	VOC	Risk-based concentrations: Tap water ug/l	Ambient air ug/m3	Fish mg/kg	Soil Industrial mg/kg	Residential mg/kg	Region III SSLs, Soil, for groundwater migration: DAF 1 mg/kg	DAF 20 mg/kg
ACETALDEHYDE	75070			2.57E-003 I	7.7E-003 I	y	1.6E+000 C	8.1E-001 C				3 8E-004	7.7E-003 C
ACETOCHLOR	34256821	2E-002 I					7.3E+002 N	7 3E+001 N	2.7E+001 N	4.1E+004 N	1.6E+003 N		
ACETONE	67641	1.00E-001 I				y	6.1E+002 N	3.7E+002 N	1.4E+002 N	2.0E+005 N	7.8E+003 N	1 2E-001	2 5E+000 N
ACETONITRILE	75058			1.7E-002 I		y	1.2E+002 N	6 2E+001 N				2.9E-002	5.8E-001 N
ACETOPHENONE	98862	1.00E-001 I		5.70E-006 W		y	4.2E-002 N	2.1E-002 N	1.4E+002 N	2.0E+005 N	7.8E+003 N	1.1E-005	2.2E-004 N
ACROLEIN	107028	2 00E-002 H		5.70E-006 I		y	4.2E-002 N	2.1E-002 N	2.7E+001 N	4.1E+004 N	1.6E+003 N	1.0E-005	2.0E-004 N
ACRYLAMIDE	79061	2 00E-004 I	4.50E+000 I		4.50E+000 I		1 5E-002 C	1.4E-003 C	7 0E-004 C	1.3E+000 C	1.4E-001 C	3.7E-006	7.4E-005 C
ACRYLONITRILE	107131	1.00E-003 H	5 40E-001 I	5.70E-004 I	2.40E-001 I	y	3.7E-002 C	2 6E-002 C	5 8E-003 C	1 1E+001 C	1 2E+000 C	7 4E-006	1.5E-004 C
ALACHLOR	15972608	1.00E-002 I	8 00E-002 H				8.4E-001 C	7.8E-002 C	3.9E-002 C	7.2E+001 C	8.0E+000 C	3.5E-004	7.0E-003 C
ALAR	1596845	1.50E-001 I					5.5E+003 N	5.5E+002 N	2 0E+002 N	3.1E+005 N	1.2E+004 N		
ALDICARB	116063	1 00E-003 I					3.7E+001 N	3.7E+000 N	1.4E+000 N	2.0E+003 N	7.8E+001 N	1.0E-002	2.1E-001 N
ALDICARB SULFONE	1646884	1.00E-003 I					3.7E+001 N	3.7E+000 N	1.4E+000 N	2.0E+003 N	7.8E+001 N	7.5E-003	1.5E-001 N
ALDRIN	309002	3 00E-005 I	1.70E+001 I		1.70E+001 I		3.9E-003 C	3.7E-004 C	1.9E-004 C	3.4E-001 C	3 8E-002 C	3 8E-004	7.7E-003 C
ALUMINUM	7429905	1.00E+000 E		1.00E-003 E			3.7E+004 N	3.7E+000 N	1.4E+003 N	2 0E+006 N	7 8E+004 N		
AMINODINITROTOLUENES		6.00E-005 E					2 2E+000 N	2.2E-001 N	8.1E-002 N	1 2E+002 N	4.7E+000 N		
4-AMINOPYRIDINE	504245	2.00E-005 H					7.3E-001 N	7.3E-002 N	2 7E-002 N	4 1E+001 N	1.6E+000 N		
AMMONIA	7664417			2 86E-002 I		y	2.1E+002 N	1.0E+002 N					
ANILINE	62533	7.00E-003 E	5 70E-003 I	2.90E-004 I			1 2E+001 C	1.1E+000 N	5 5E-001 C	1.0E+003 C	1.1E+002 C I	6.8E-003	1.4E-001 C
ANTIMONY	7440360	4 00E-004 I					1.5E+001 N	1.5E+000 N	5.4E-001 N	8.2E+002 N	3.1E+001 N	6.6E-001	1.3E+001 N
ANTIMONY PENTOXIDE	1314609	5 00E-004 H					1 8E+001 N	1.8E+000 N	6.8E-001 N	1.0E+003 N	3.9E+001 N		
ANTIMONY TETROXIDE	1332816	4.00E-004 H					1.5E+001 N	1.5E+000 N	5 4E-001 N	8.2E+002 N	3.1E+001 N		
ANTIMONY TRIOXIDE	1309644	4.00E-004 H		5.70E-005 I			1.5E+001 N	2.1E-001 N	5 4E-001 N	8 2E+002 N	3.1E+001 N		
ARSENIC	7440382	3 00E-004 I	1 50E+000 I		1.51E+001 I		4.5E-002 C	4.1E-004 C	2.1E-003 C	3.8E+000 C	4.3E-001 C	1.3E-003	2.6E-002 C
ARSINE	7784421			1.40E-005 I		y	1.0E-001 N	5.1E-002 N					
ASSURE	76578148	9 00E-003 I					3.3E+002 N	3.3E+001 N	1.2E+001 N	1 8E+004 N	7.0E+002 N		
ATRAZINE	1912249	3.50E-002 I	2 20E-001 H				3.0E-001 C	2.8E-002 C	1.4E-002 C	2 6E+001 C	2 9E+000 C	4 4E-004	8.8E-003 C
AZOBENZENE	103333		1 10E-001 I		1.10E-001 I		6.1E-001 C	5.7E-002 C	2.9E-002 C	5.2E+001 C	5.8E+000 C	1.8E-003	3.5E-002 C
BARIUM	7440393	7 00E-002 I		1 40E-004 A			2.6E+003 N	5.1E-001 N	9 5E+001 N	1 4E+005 N	5 5E+003 N	1 1E+002	2.1E+003 N
BAYGON	114261	4.00E-003 I					1 5E+002 N	1.5E+001 N	5 4E+000 N	8 2E+003 N	3 1E+002 N		
BAYTHROID	68359375	2 50E-002 I					9.1E+002 N	9.1E+001 N	3 4E+001 N	5 1E+004 N	2.0E+003 N		
BENTAZON	25057890	3.00E-002 I					1.1E+003 N	1.1E+002 N	4 1E+001 N	6 1E+004 N	2 3E+003 N		
BENZALDEHYDE	100527	1 00E-001 I					3 7E+003 N	3 7E+002 N	1 4E+002 N	2 0E+005 N	7 8E+003 N		
BENZENE	71432	3 00E-003 E	5 5E-002 I	1 70E-003 E	2 90E-002 I	y	3.2E-001 C	2.2E-001 C	5 7E-002 C	1.0E+002 C	1.2E+001 C	9.0E-005	1.8E-003 C
BENZENETHIOL	108985	1 00E-005 H				y	6.1E-002 N	3.7E-002 N	1.4E-002 N	2.0E+001 N	7.8E-001 N		
BENZIDINE	92875	3.00E-003 I	2 30E+002 I		2 30E+002 I		2.9E-004 C	2.7E-005 C	1 4E-005 C	2.5E-002 C	2.8E-003 C		
BENZOIC ACID	65850	4.00E+000 I					1.5E+005 N	1.5E+004 N	5.4E+003 N	8.2E+006 N	3.1E+005 N		
BENZYL ALCOHOL	100516	3 00E-001 H					1.1E+004 N	1 1E+003 N	4 1E+002 N	6.1E+005 N	2.3E+004 N	4.4E+000	8.8E+001 N
BENZYL CHLORIDE	100447		0 17 I			y	6.2E-002 C	3.7E-002 C	1 9E-002 C	3 4E+001 C	3 8E+000 C	1 9E-005	3.7E-004 C
BERYLLIUM	7440417	2.00E-003 I		5.7E-006 I	8.40E+000 I		7.3E+001 N	7.5E-004 C	2.7E+000 N	4.1E+003 N	1 6E+002 N	5.8E+001	1 2E+003 N
BIPHENYL	92524	5.00E-002 I				y	3 0E+002 N	1 8E+002 N	6 8E+001 N	1.0E+005 N	3 9E+003 N	4 8E+000	9.6E+001 N
BIS(2-CHLOROETHYL)ETHER	111444		1 10E+000 I		1 10E+000 I	y	9 6E-003 C	5 7E-003 C	2 9E-003 C	5 2E+000 C	5 8E-001 C	2.2E-006	4.4E-005 C
BIS(2-CHLOROISOPROPYL)ETHER	108601	4 00E-002 I	7 00E-002 H		3 50E-002 H	y	2 6E-001 C	1.8E-001 C	4 5E-002 C	8.2E+001 C	9.1E+000 C	8.4E-005	1.7E-003 C
BIS(CHLOROMETHYL)ETHER	542881		2 20E+002 I		2.20E+002 I	y	4.8E-005 C	2.8E-005 C	1 4E-005 C	2 6E-002 C	2 9E-003 C	9 7E-009	1.9E-007 C
BIS(2-ETHYLHEXYL)PHTHALATE	117817	2 00F-002 I	1 40E-002 I		1 40E-002 E		4 8E+000 C	4 5E-001 C	2 3E-001 C	4 1E+002 C	4.6E+001 C	1.4E+002	2.9E+003 C
BORON	7440428	9 00E-002 I		5 70E-003 H			3.3E+003 N	2.1E+001 N	1 2E+002 N	1 8E+005 N	7.0E+003 N		

Sources I = IRIS H = HEAST A = HEAST Alternate W = Withdrawn from IRIS or HEAST E = EPA NCEA provisional value O = other							Basis C = Carcinogenic effects N = Noncarcinogenic effects I = RBC at HI of 0.1 < RBC c Risk-based concentrations					Region III SSLs Soil, for groundwater migration	
Chemical	CAS	RfDo mg/kg/d	CSFo 1/mg/kg/d	RfDi mg/kg/d	CSFi 1/mg/kg/d	VOC	Tap water ug/l	Ambient air ug/m3	Fish mg/kg	Soil Industrial mg/kg	Residential mg/kg	DAF 1 mg/kg	DAF 20 mg/kg
BROMODICHLOROMETHANE	75274	2.00E-002 I	6.20E-002 I			y	1.7E-001 C	1.0E-001 C	5.1E-002 C	9.2E+001 C	1.0E+001 C	5.4E-005	1.1E-003 C
BROMOETHENE	593602			8.6E-004 I	1.10E-001 H	y	1.1E-001 C	5.7E-002 C				5.4E-005	1.1E-003 C
"BROMOFORM	75252	2.00E-002 I	7.90E-003 I		3.90E-003 I		8.5E+000 C	1.6E+000 C	4.0E-001 C	7.2E+002 C	8.1E+001 C	3.3E-003	6.7E-002 C
BROMOMETHANE	74839	1.40E-003 I		1.40E-003 I		y	8.5E+000 N	5.1E+000 N	1.9E+000 N	2.9E+003 N	1.1E+002 N	2.1E-003	4.1E-002 N
BROMOPHOS	2104963	5.00E-003 H					1.8E+002 N	1.8E+001 N	6.8E+000 N	1.0E+004 N	3.9E+002 N		
1,3-BUTADIENE	106990				1.80E+000 H	y	7.0E-003 C	3.5E-003 C				3.9E-006	7.8E-005 C
1-BUTANOL	71363	1.00E-001 I					3.7E+003 N	3.7E+002 N	1.4E+002 N	2.0E+005 N	7.8E+003 N	7.8E-001	1.6E+001 N
BUTYLBENZYLPHTHALATE	85687	2.00E-001 I					7.3E+003 N	7.3E+002 N	2.7E+002 N	4.1E+005 N	1.6E+004 N	8.4E+002	1.7E+004 N
BUTYLATE	2008415	5.00E-002 I					1.8E+003 N	1.8E+002 N	6.8E+001 N	1.0E+005 N	3.9E+003 N		
N-BUTYLBENZENE	104518	4.00E-002 E				y	2.4E+002 N	1.5E+002 N	5.4E+001 N	8.2E+004 N	3.1E+003 N		
SEC-BUTYLBENZENE	135988	4.00E-002 E				y	2.4E+002 N	1.5E+002 N	5.4E+001 N	8.2E+004 N	3.1E+003 N		
TERT-BUTYLBENZENE	98066	4.00E-002 E				y	2.4E+002 N	1.5E+002 N	5.4E+001 N	8.2E+004 N	3.1E+003 N		
CADMIUM-WATER	7440439	5.00E-004 I		5.7E-005 E	6.30E+000 I		1.8E+001 N	9.9E-004 C	6.8E-001 N	1.0E+003 N	3.9E+001 N	1.4E+000	2.7E+001 N
CADMIUM-FOOD	7440439	1.00E-003 I		5.7E-005 E	6.30E+000 I		3.7E+001 N	9.9E-004 C	1.4E+000 N	2.0E+003 N	7.8E+001 N	2.7E+000	5.5E+001 N
CAPROLACTAM	105602	5.00E-001 I					1.8E+004 N	1.8E+003 N	6.8E+002 N	1.0E+006 N	3.9E+004 N		
CARBARYL	63252	1.00E-001 I					3.7E+003 N	3.7E+002 N	1.4E+002 N	2.0E+005 N	7.8E+003 N	1.5E+000	3.0E+001 N
CARBON DISULFIDE	75150	1.00E-001 I		2.00E-001 I		y	1.0E+003 N	7.3E+002 N	1.4E+002 N	2.0E+005 N	7.8E+003 N	9.5E-001	1.9E+001 N
CARBON TETRACHLORIDE	56235	7.00E-004 I	1.30E-001 I	5.71E-004 E	5.30E-002 I	y	1.6E-001 C	1.2E-001 C	2.4E-002 C	4.4E+001 C	4.9E+000 C	1.1E-004	2.1E-003 C
CARBOSULFAN	55285148	1.00E-002 I					3.7E+002 N	3.7E+001 N	1.4E+001 N	2.0E+004 N	7.8E+002 N		
CHLORAL HYDRATE	302170	1.00E-001 I					3.7E+003 N	3.7E+002 N	1.4E+002 N	2.0E+005 N	7.8E+003 N		
CHLORANIL	118752		4.00E-001 H				1.7E-001 C	1.6E-002 C	7.9E-003 C	1.4E+001 C	1.6E+000 C		
CHLORDANE	57749	5.00E-004 I	3.5E-001 I	2.00E-004 I	3.5E-001 I		1.9E-001 C	1.8E-002 C	9.0E-003 C	1.6E+001 C	1.8E+000 C	4.6E-002	9.2E-001 C
CHLORINE	7782505	1.00E-001 I		5.7E-005 E		y	4.2E-001 N	2.1E-001 N	1.4E+002 N	2.0E+005 N	7.8E+003 N		
CHLORINE DIOXIDE	10049044			5.70E-005 I		y	4.2E-001 N	2.1E-001 N					
CHLOROACETIC ACID	79118	2.00E-003 H					7.3E+001 N	7.3E+000 N	2.7E+000 N	4.1E+003 N	1.6E+002 N		
4-CHLOROANILINE	106478	4.00E-003 I					1.5E+002 N	1.5E+001 N	5.4E+000 N	8.2E+003 N	3.1E+002 N	4.8E-002	9.7E-001 N
CHLOROBENZENE	108907	2.00E-002 I		1.7E-002 E		y	1.1E+002 N	6.2E+001 N	2.7E+001 N	4.1E+004 N	1.6E+003 N	4.0E-002	8.0E-001 N
CHLOROBENZILATE	510156	2.00E-002 I	2.70E-001 H		2.70E-001 H		2.5E-001 C	2.3E-002 C	1.2E-002 C	2.1E+001 C	2.4E+000 C	1.3E-003	2.7E-002 C
P-CHLOROBENZOIC ACID	74113	2.00E-001 H					7.3E+003 N	7.3E+002 N	2.7E+002 N	4.1E+005 N	1.6E+004 N		
2-CHLORO-1,3-BUTADIENE	126998	2.00E-002 A		2.00E-003 H		y	1.4E+001 N	7.3E+000 N	2.7E+001 N	4.1E+004 N	1.6E+003 N	6.0E-003	1.2E-001 N
1-CHLOROBUTANE	109693	4.00E-001 H				y	2.4E+003 N	1.5E+003 N	5.4E+002 N	8.2E+005 N	3.1E+004 N	1.0E+000	2.0E+001 N
1-CHLORO-1,1-DIFLUOROETHANE	75683			1.40E+001 I		y	1.0E+005 N	5.1E+004 N				7.0E+001	1.4E+003 N
CHLORODIFLUOROMETHANE	75456			1.40E+001 I		y	1.0E+005 N	5.1E+004 N				7.0E+001	1.4E+003 N
CHLOROETHANE	75003	4.00E-001 E	2.90E-003 E	2.90E+000 I		y	3.6E+000 C	2.2E+000 C	1.1E+000 C	2.0E+003 C	2.2E+002 C	9.6E-004	1.9E-002 C
CHLOROFORM	67663	1.00E-002 I	6.10E-003 I	8.6E-005 E	8.10E-002 I	y	1.5E-001 C I	7.7E-002 C I	5.2E 001 C	9.4E+002 C	1.0E+002 C I	4.5E-005	8.9E-004 C
CHLOROMETHANE	74873		1.30E-002 H	8.6E-002 E	3.5E-003 E	y	2.1E+000 C	1.8E+000 C	2.4E-001 C	4.4E+002 C	4.9E+001 C	5.2E-004	1.0E-002 C
4-CHLORO-2-METHYLANILINE	95692		5.80E-001 H				1.2E-001 C	1.1E-002 C	5.4E-003 C	9.9E+000 C	1.1E+000 C		
BETA-CHLORONAPHTHALENE	91587	8.00E-002 I				y	4.9E+002 N	2.9E+002 N	1.1E+002 N	1.6E+005 N	6.3E+003 N	1.6E+000	3.2E+001 N
O-CHLORONITROBENZENE	88733		2.50E-002 H			y	4.2E-001 C	2.5E-001 C	1.3E-001 C	2.3E+002 C	2.6E+001 C		
P-CHLORONITROBENZENE	100005		1.80E-002 H			y	5.9E-001 C	3.5E-001 C	1.8E-001 C	3.2E+002 C	3.5E+001 C		
2-CHLOROPHENOL	95578	5.00E-003 I				y	3.0E+001 N	1.8E+001 N	6.8E+000 N	1.0E+004 N	3.9E+002 N		
2-CHLOROPROPANE	75296			2.90E-002 H		y	2.1E+002 N	1.1E+002 N				6.6E-002	1.3E+000 N
O-CHLOROTOLUENE	95498	2.00E-002 I				y	1.2E+002 N	7.3E+001 N	2.7E+001 N	4.1E+004 N	1.6E+003 N	6.5E-002	1.3E+000 N
CHLORPYRIFOS	2921882	3.00E-003 I					1.1E+002 N	1.1E+001 N	4.1E+000 N	6.1E+003 N	2.3E+002 N	3.2E+000	6.3E+001 N
CHLORPYRIFOS-METHYL	5598130	1.00E-002 H					3.7E+002 N	3.7E+001 N	1.4E+001 N	2.0E+004 N	7.8E+002 N		

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E = EPA NCEA provisional value O = other

Basis: C = Carcinogenic effects N = Noncarcinogenic effects I = RBC at HI of 0.1 = RBC < c

							Risk-based concentrations					Region III SSLs	
												Soil, for groundwater migration	
Chemical	CAS	RfDo mg/kg/d	CSFo 1/mg/kg/d	RfDi mg/kg/d	CSFi 1/mg/kg/d	VOC	Tap water ug/l	Ambient air ug/m3	Fish mg/kg	Soil Industrial mg/kg	Soil Residential mg/kg	DAF 1 mg/kg	DAF 20 mg/kg
CHROMIUM III	16065831	1.50E+000 I					5.5E+004 N	5.5E+003 N	2.0E+003 N	3 1E+006 N	1 2E+005 N	9 9E+007	2.0E+009 N
CHROMIUM VI	18540299	3 00E-003 I		3.00E-005 I	4.10E+001 H		1.1E+002 N	1.5E-004 C	4.1E+000 N	6.1E+003 N	2.3E+002 N	2.1E+000	4.2E+001 N
COBALT	7440484	6.00E-002 E					2.2E+003 N	2.2E+002 N	8.1E+001 N	1.2E+005 N	4.7E+003 N		
COKE OVEN EMISSIONS (COAL TAR)	8007452				2 2 I			2 8E-003 C					
COPPER	7440508	4.00E-002 H					1.5E+003 N	1.5E+002 N	5.4E+001 N	8.2E+004 N	3.1E+003 N	5.3E+002	1.1E+004 N
CROTONALDEHYDE	123739		1.90E+000 H			y	5.5E-003 C	3.3E-003 C	1.7E-003 C	3.0E+000 C	3.4E-001 C	1.5E-005	3.1E-004 C
CUMENE	98828	1.00E-001 I		1.10E-001 I		y	6.6E+002 N	4.0E+002 N	1.4E+002 N	2.0E+005 N	7.8E+003 N	3 2E+000	6.4E+001 N
CYANIDE (FREE)	57125	2.00E-002 I					7.3E+002 N	7.3E+001 N	2 7E+001 N	4.1E+004 N	1.6E+003 N	7.4E+000	1.5E+002 N
CALCIUM CYANIDE	592018	4E-002 I					1.5E+003 N	1.5E+002 N	5 4E+001 N	8.2E+004 N	3 1E+003 N		
COPPER CYANIDE	544923	5.00E-003 I					1.8E+002 N	1.8E+001 N	6 8E+000 N	1.0E+004 N	3.9E+002 N		
CYANAZINE	21725462	2 00E-003 H	8 40E-001 H				8.0E-002 C	7.5E-003 C	3 8E-003 C	6 8E+000 C	7 6E-001 C	2.6E-005	5.3E-004 C
CYANOGEN	460195	4 00E-002 I				y	2.4E+002 N	1 5E+002 N	5 4E+001 N	8.2E+004 N	3 1E+003 N		
CYANOGEN BROMIDE	506683	9.00E-002 I					3.3E+003 N	3.3E+002 N	1 2E+002 N	1.8E+005 N	7.0E+003 N		
CYANOGEN CHLORIDE	506774	5.00E-002 I					1.8E+003 N	1.8E+002 N	6 8E+001 N	1.0E+005 N	3.9E+003 N		
HYDROGEN CYANIDE	74908	2.00E-002 I		8.60E-004 I		y	6.2E+000 N	3.1E+000 N	2.7E+001 N	4.1E+004 N	1.6E+003 N	1.1E-001	2.2E+000 N
POTASSIUM CYANIDE	151508	5.00E-002 I					1.8E+003 N	1.8E+002 N	6.8E+001 N	1.0E+005 N	3.9E+003 N		
POTASSIUM SILVER CYANIDE	506616	2.00E-001 I					7.3E+003 N	7.3E+002 N	2 7E+002 N	4.1E+005 N	1.6E+004 N		
SILVER CYANIDE	506649	1.00E-001 I					3.7E+003 N	3.7E+002 N	1.4E+002 N	2.0E+005 N	7.8E+003 N	3.1E+001	6.2E+002 N
SODIUM CYANIDE	143339	4.00E-002 I					1.5E+003 N	1 5E+002 N	5 4E+001 N	8 2E+004 N	3 1E+003 N		
THIOCYANATE		5.00E-002 E					1.8E+003 N	1.8E+002 N	6 8E+001 N	1 0E+005 N	3 9E+003 N		
ZINC CYANIDE	557211	5.00E-002 I					1.8E+003 N	1.8E+002 N	6.8E+001 N	1.0E+005 N	3 9E+003 N	1.1E+002	2.3E+003 N
CYCLOHEXANONE	108941	5 00E+000 I					1.8E+005 N	1.8E+004 N	6.8E+003 N	1.0E+007 N	3.9E+005 N	6.1E+001	1.2E+003 N
CYHALOTHRIN/KARATE	68085858	5.00E-003 I					1.8E+002 N	1.8E+001 N	6.8E+000 N	1.0E+004 N	3.9E+002 N		
CYPERMETHRIN	52315078	1.00E-002 I					3.7E+002 N	3.7E+001 N	1.4E+001 N	2 0E+004 N	7.8E+002 N		
DACTHAL	1861321	1.00E-002 I					3.7E+002 N	3.7E+001 N	1 4E+001 N	2 0E+004 N	7.8E+002 N		
DALAPON	75990	3.00E-002 I					1.1E+003 N	1.1E+002 N	4.1E+001 N	6 1E+004 N	2.3E+003 N	3 5E-001	7.1E+000 N
DDD	72548		2 40E-001 I				2.8E-001 C	2.6E-002 C	1 3E-002 C	2 4E+001 C	2 7E+000 C	5.6E-001	1.1E+001 C
DDE	72559		3.40E-001 I				2.0E-001 C	1.8E-002 C	9.3E-003 C	1.7E+001 C	1.9E+000 C	1.8E+000	3.6E+001 C
DDT	50293	5 00E-004 I	3 40E-001 I		3.40E-001 I		2.0E-001 C	1.8E-002 C	9.3E-003 C	1.7E+001 C	1.9E+000 C	5.8E-002	1.2E+000 C
DIAZINON	333415	9.00E-004 H					3.3E+001 N	3.3E+000 N	1.2E+000 N	1.8E+003 N	7 0E+001 N	2.1E-002	4.3E-001 N
DIBENZOFURAN	132649	4 00E-003 E				y	2.4E+001 N	1.5E+001 N	5 4E+000 N	8.2E+003 N	3.1E+002 N	3.8E-001	7.7E+000 N
1,4-DIBROMOBENZENE	106376	1 00E-002 I					3.7E+002 N	3 7E+001 N	1 4E+001 N	2 0E+004 N	7 8E+002 N		
DIBROMOCHLOROMETHANE	124481	2.00E-002 I	8.40E-002 I			y	1.3E-001 C	7.5E-002 C	3.8E-002 C	6.8E+001 C	7.6E+000 C	4.1E-005	8.3E-004 C
1,2-DIBROMO-3-CHLOROPROPANE	96128		1 40E+000 H	5 70E-005 I	2 40E-003 H	y	4.7E-002 C I	2.1E-001 N	2 3E-003 C	4.1E+000 C	4 6E-001 C	4.4E-005	8.7E-004 C
1,2-DIBROMOETHANE	106934		8 50E+001 I	5.70E-005 H	7 60E-001 I	y	7.5E-004 C	8 2E-003 C	3 7E-005 C	6 7E-002 C	7 5E-003 C	4.3E-007	8.5E-006 C
DIBUTYLPHTHALATE	84742	1 00E-001 I					3.7E+003 N	3.7E+002 N	1 4E+002 N	2 0E+005 N	7 8E+003 N	2.5E+002	5.0E+003 N
DICAMBA	1918009	3 00E-002 I					1.1E+003 N	1.1E+002 N	4 1E+001 N	6.1E+004 N	2 3E+003 N	2.2E-001	4.5E+000 N
1,2-DICHLOROBENZENE	95501	9 00E-002 I				y	5.5E+002 N	3.3E+002 N	1 2E+002 N	1 8E+005 N	7 0E+003 N	4.6E-001	9.3E+000 N
1,3-DICHLOROBENZENE	541731	9.00E-004 E				y	5 5E+000 N	3.3E+000 N	1 2E+000 N	1.8E+003 N	7.0E+001 N	4.4E-003	8.7E-002 N
1,4-DICHLOROBENZENE	106467	3 00E-002 E	2.40E-002 H	2 29E-001 I	2 2E-002 E	y	4 7E-001 C	2.8E-001 C	1 3E-001 C	2.4E+002 C	2.7E+001 C	3 6E-004	7.1E-003 C
3,3'-DICHLOROBENZIDINE	91941		4 50E-001 I				1 5E-001 C	1 4E-002 C	7 0E-003 C	1 3E+001 C	1 4E+000 C	2 5E-004	4 9E-003 C
1,4-DICHLORO-2-BUTENE	764410				9 30E+000 H	y	1.3E-003 C	6 7E-004 C				4.0E-007	8 0E-006 C
DICHLORODIFLUOROMETHANE	75718	2 00E-001 I		5 00E-002 A		y	3.5E+002 N	1.8E+002 N	2 7E+002 N	4 1E+005 N	1.6E+004 N	5.5E-001	1.1E+001 N
1,1-DICHLOROETHANE	75343	1 00E-001 H		1 40E-001 A		y	8 0E+002 N	5.1E+002 N	1 4E+002 N	2 0E+005 N	7 8E+003 N	2 3E-001	4 5E+000 N
1,2-DICHLOROETHANE	107062	3 00E-002 E	9.10E-002 I	1 40E-003 E	9.10E-002 I	y	1.2E-001 C	6.9E-002 C	3.5E-002 C	6 3E+001 C	7.0E+000 C	5.2E-005	1.0E-003 C

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Basis: C = Carcinogenic effects N = Noncarcinogenic effects I = RBC at HI of 0.1 < RBC-c

Chemical	CAS	RfDo mg/kg/d	CSFo 1/mg/kg/d	RfDi mg/kg/d	CSFi 1/mg/kg/d	VOC	Risk-based concentrations: Tap water ug/l	Ambient air ug/m3	Fish mg/kg	Soil Industrial mg/kg	Residential mg/kg	Region III SSLs, Soil, for groundwater migration: DAF 1 mg/kg	DAF 20 mg/kg
1,1-DICHLOROETHENE	75354	9.00E-003 I	6.00E-001 I		1.75E-001 I	y	4.4E-002 C	3.6E-002 C	5.3E-003 C	9.5E+000 C	1.1E+000 C	1.8E-005	3.6E-004 C
CIS-1,2-DICHLOROETHENE	156592	1.00E-002 H				y	6.1E+001 N	3.7E+001 N	1.4E+001 N	2.0E+004 N	7.8E+002 N	1.7E-002	3.5E-001 N
TRANS-1,2-DICHLOROETHENE	156605	2.00E-002 I				y	1.2E+002 N	7.3E+001 N	2.7E+001 N	4.1E+004 N	1.6E+003 N	4.1E-002	8.2E-001 N
TOTAL 1,2-DICHLOROETHENE	540590	9.00E-003 H				y	5.5E+001 N	3.3E+001 N	1.2E+001 N	1.8E+004 N	7.0E+002 N	1.9E-002	3.7E-001 N
2,4-DICHLOROPHENOL	120832	3.00E-003 I					1.1E+002 N	1.1E+001 N	4.1E+000 N	6.1E+003 N	2.3E+002 N	6.0E-002	1.2E+000 N
2,4-D	94757	1.00E-002 I					3.7E+002 N	3.7E+001 N	1.4E+001 N	2.0E+004 N	7.8E+002 N	4.5E-001	9.0E+000 N
4-(2,4-DICHLOROPHENOXY)BUTYRIC ACID	94826	8E-003 I					2.9E+002 N	2.9E+001 N	1.1E+001 N	1.6E+004 N	6.3E+002 N		
1,2-DICHLOROPROPANE	78875		6.80E-002 H	1.14E-003 I		y	1.6E-001 C	9.2E-002 C	4.6E-002 C	8.4E+001 C	9.4E+000 C	1.0E-004	2.1E-003 C
2,3-DICHLOROPROPANOL	616239	3.00E-003 I					1.1E+002 N	1.1E+001 N	4.1E+000 N	6.1E+003 N	2.3E+002 N		
**1,3-DICHLOROPROPENE	542756	3.00E-002 I	1.00E-001 I	5.71E-003 I	1.00E-002 I	y	4.4E-001 C	6.3E-001 C	3.2E-002 C	5.7E+001 C	6.4E+000 C	1.6E-004	3.1E-003 C
DICHLORVOS	62737	5E-004 I	0.29 I	1.43E-004 I			2.3E-001 C	2.2E-002 C	1.1E-002 C	2.0E+001 C	2.2E+000 C	5.5E-005	1.1E-003 C
DICOFOL	115322		4.4E-001 W				1.5E-001 C	1.4E-002 C	7.2E-003 C	1.3E+001 C	1.5E+000 C	9.3E-004	1.9E-002 C
DICYCLOPENTADIENE	77736	3E-002 H		6.00E-005 A		y	4.4E-001 N	2.2E-001 N	4.1E+001 N	6.1E+004 N	2.3E+003 N		
DIELDRIN	60571	5.00E-005 I	1.60E+001 I		1.60E+001 I		4.2E-003 C	3.9E-004 C	2.0E-004 C	3.6E-001 C	4.0E-002 C	1.1E-004	2.2E-003 C
DIESEL EMISSIONS				1.40E-003 I				5.1E+000 N					
DIETHYLPHTHALATE	84662	8.00E-001 I					2.9E+004 N	2.9E+003 N	1.1E+003 N	1.6E+006 N	6.3E+004 N	2.3E+001	4.5E+002 N
DIETHYLENE GLYCOL, MONOBUTYL ETHER	112345			5.70E-003 H				2.1E+001 N					
DIETHYLENE GLYCOL, MONOETHYL ETHER	111900	2.00E+000 H					7.3E+004 N	7.3E+003 N	2.7E+003 N	4.1E+006 N	1.6E+005 N		
DI(2-ETHYLHEXYL)ADIPATE	103231	6.00E-001 I	1.20E-003 I				5.6E+001 C	5.2E+000 C	2.6E+000 C	4.8E+003 C	5.3E+002 C		
DIETHYLSTILBESTROL	56531		4.70E+003 H				1.4E-005 C	1.3E-006 C	6.7E-007 C	1.2E-003 C	1.4E-004 C		
DIFENZOQUAT (AVENGE)	43222486	8.00E-002 I					2.9E+003 N	2.9E+002 N	1.1E+002 N	1.6E+005 N	6.3E+003 N		
1,1-DIFLUOROETHANE	75376			1.10E+001 I		y	8.0E+004 N	4.0E+004 N					
DIISOPROPYL METHYLPHOSPHONATE (DIMP)	1445756	*8.00E-002 I*					*2.9E+003 N*	*2.9E+002 N*	*1.1E+002 N*	*1.6E+005 N*	*6.3E+003 N*		
3,3'-DIMETHOXYBENZIDINE	119904		1.40E-002 H				4.8E+000 C	4.5E-001 C	2.3E-001 C	4.1E+002 C	4.6E+001 C		
DIMETHYLAMINE	124403			5.70E-006 W		y	4.2E-002 N	2.1E-002 N				8.5E-006	1.7E-004 N
2,4-DIMETHYLANILINE HYDROCHLORIDE	21436964		5.80E-001 H				1.2E-001 C	1.1E-002 C	5.4E-003 C	9.9E+000 C	1.1E+000 C		
2,4-DIMETHYLANILINE	95681		7.50E-001 H				8.9E-002 C	8.3E-003 C	4.2E-003 C	7.6E+000 C	8.5E-001 C		
N,N-DIMETHYLANILINE	121697	2.00E-003 I					7.3E+001 N	7.3E+000 N	2.7E+000 N	4.1E+003 N	1.6E+002 N		
3,3'-DIMETHYLBENZIDINE	119937		9.20E+000 H				7.3E-003 C	6.8E-004 C	3.4E-004 C	6.2E-001 C	6.9E-002 C		
1,1-DIMETHYLHYDRAZINE	57147		2.60E+000 W		3.50E+000 W		2.6E-002 C	1.8E-003 C	1.2E-003 C	2.2E+000 C	2.5E-001 C		
1,2-DIMETHYLHYDRAZINE	540738		3.70E+001 W		3.70E+001 W		1.8E-003 C	1.7E-004 C	8.5E-005 C	1.5E-001 C	1.7E-002 C		
2,4-DIMETHYLPHENOL	105679	2.00E-002 I					7.3E+002 N	7.3E+001 N	2.7E+001 N	4.1E+004 N	1.6E+003 N	3.4E-001	6.7E+000 N
2,6-DIMETHYLPHENOL	576261	6.00E-004 I					2.2E+001 N	2.2E+000 N	8.1E-001 N	1.2E+003 N	4.7E+001 N		
3,4-DIMETHYLPHENOL	95658	1.00E-003 I					3.7E+001 N	3.7E+000 N	1.4E+000 N	2.0E+003 N	7.8E+001 N		
DIMETHYLPHTHALATE	131113	1.00E+001 W					3.7E+005 N	3.7E+004 N	1.4E+004 N	2.0E+007 N	7.8E+005 N		
1,2-DINITROBENZENE	528290	4.00E-004 H					1.5E+001 N	1.5E+000 N	5.4E-001 N	8.2E+002 N	3.1E+001 N		
1,3-DINITROBENZENE	99650	1.00E-004 I					3.7E+000 N	3.7E-001 N	1.4E-001 N	2.0E+002 N	7.8E+000 N	1.8E-003	3.7E-002 N
1,4-DINITROBENZENE	100254	4.00E-004 H					1.5E+001 N	1.5E+000 N	5.4E-001 N	8.2E+002 N	3.1E+001 N		
4,6-DINITRO-O-CYCLOHEXYL PHENOL	131895	2.00E-003 I					7.3E+001 N	7.3E+000 N	2.7E+000 N	4.1E+003 N	1.6E+002 N		
4,6-DINITRO-2-METHYLPHENOL	534521	1.00E-004 E					3.7E+000 N	3.7E-001 N	1.4E-001 N	2.0E+002 N	7.8E+000 N		
2,4-DINITROPHENOL	51285	2.00E-003 I					7.3E+001 N	7.3E+000 N	2.7E+000 N	4.1E+003 N	1.6E+002 N		
DINITROTOLUENE MIX			6.80E-001 I				9.8E-002 C	9.2E-003 C	4.6E-003 C	8.4E+000 C	9.4E-001 C		
2,4-DINITROTOLUENE	121142	2.00E-003 I					7.3E+001 N	7.3E+000 N	2.7E+000 N	4.1E+003 N	1.6E+002 N	2.8E-002	5.7E-001 N
2,6-DINITROTOLUENE	606202	1.00E-003 H					3.7E+001 N	3.7E+000 N	1.4E+000 N	2.0E+003 N	7.8E+001 N	1.2E-002	2.5E-001 N
DINOSEB	88857	1.00E-003 I					3.7E+001 N	3.7E+000 N	1.4E+000 N	2.0E+003 N	7.8E+001 N	8.7E-003	1.7E-001 N

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Chemical	CAS	RfDo mg/kg/d	CSFo 1/mg/kg/d	RfDi mg/kg/d	CSFi 1/mg/kg/d	VOC	Risk-based concentrations: Tap water ug/l	Ambient air ug/m3	Fish mg/kg	Soil Industrial mg/kg	Soil Residential mg/kg	Region III SSLs, Soil, for groundwater migration: DAF 1 mg/kg	DAF 20 mg/kg
DIOCTYLPHTHALATE	117840	2.00E-002 H					7.3E+002 N	7.3E+001 N	2.7E+001 N	4.1E+004 N	1.6E+003 N	1.2E+005	2.4E+006 N
1,4-DIOXANE	123911		1.10E-002 I				6.1E+000 C	5.7E-001 C	2.9E-001 C	5.2E+002 C	5.8E+001 C	1.3E-003	2.6E-002 C
DIPHENYLAMINE	122394	2.50E-002 I					9.1E+002 N	9.1E+001 N	3.4E+001 N	5.1E+004 N	2.0E+003 N	1.3E+000	2.5E+001 N
1,2-DIPHENYLHYDRAZINE	122667		8.00E-001 I		8.00E-001 I		8.4E-002 C	7.8E-003 C	3.9E-003 C	7.2E+000 C	8.0E-001 C	1.3E-004	2.5E-003 C
DIQUAT	85007	2.20E-003 I					8.0E+001 N	8.0E+000 N	3.0E+000 N	4.5E+003 N	1.7E+002 N	1.7E-002	3.3E-001 N
DISULFOTON	298044	4.00E-005 I					1.5E+000 N	1.5E-001 N	5.4E-002 N	8.2E+001 N	3.1E+000 N	3.2E-003	6.4E-002 N
1,4-DITHIANE	505293	1.00E-002 I					3.7E+002 N	3.7E+001 N	1.4E+001 N	2.0E+004 N	7.8E+002 N		
DIURON	330541	2.00E-003 I					7.3E+001 N	7.3E+000 N	2.7E+000 N	4.1E+003 N	1.6E+002 N	5.8E-002	1.2E+000 N
ENDOSULFAN	115297	6.00E-003 I					2.2E+002 N	2.2E+001 N	8.1E+000 N	1.2E+004 N	4.7E+002 N	9.8E-001	2.0E+001 N
ENDRIN	72208	3.00E-004 I					1.1E+001 N	1.1E+000 N	4.1E-001 N	6.1E+002 N	2.3E+001 N	2.7E-001	5.4E+000 N
EPICHLOROHYDRIN	106898	2.00E-003 H	9.90E-003 I	2.86E-004 I	4.20E-003 I	y	2.0E+000 N	1.0E+000 N	3.2E-001 C I	5.8E+002 C I	6.5E+001 C I	4.2E-004	8.4E-003 N
ETHION	563122	5.00E-004 I					1.8E+001 N	1.8E+000 N	6.8E-001 N	1.0E+003 N	3.9E+001 N	3.2E-001	6.4E+000 N
2-ETHOXYETHANOL	110805	4.00E-001 H		5.70E-002 I			1.5E+004 N	2.1E+002 N	5.4E+002 N	8.2E+005 N	3.1E+004 N	3.3E+000	6.5E+001 N
ETHYL ACETATE	141786	9.00E-001 I				y	5.5E+003 N	3.3E+003 N	1.2E+003 N	1.8E+006 N	7.0E+004 N	1.7E+000	3.5E+001 N
ETHYLBENZENE	100414	1.00E-001 I		2.90E-001 I		y	1.3E+003 N	1.1E+003 N	1.4E+002 N	2.0E+005 N	7.8E+003 N	7.5E-001	1.5E+001 N
ETHYLENE DIAMINE	107153	2.00E-002 H					7.3E+002 N	7.3E+001 N	2.7E+001 N	4.1E+004 N	1.6E+003 N		
ETHYLENE GLYCOL	107211	2.00E+000 I					7.3E+004 N	7.3E+003 N	2.7E+003 N	4.1E+006 N	1.6E+005 N	1.5E+001	3.0E+002 N
ETHYLENE GLYCOL, MONOBUTYL ETHER	111762	5.00E-001 I		3.70E+000 I			1.8E+004 N	1.4E+004 N	6.8E+002 N	1.0E+006 N	3.9E+004 N		
ETHYLENE OXIDE	75218		1.00E+000 H		3.50E-001 H	y	2.3E-002 C	1.8E-002 C	3.2E-003 C	5.7E+000 C	6.4E-001 C	4.8E-006	9.5E-005 C
ETHYLENE THIOUREA	96457	8.00E-005 I	1.1E-001 H				6.1E-001 C I	5.7E-002 C I	2.9E-002 C I	5.2E+001 C I	5.8E+000 C I		
ETHYL ETHER	60297	2.00E-001 I				y	1.2E+003 N	7.3E+002 N	2.7E+002 N	4.1E+005 N	1.6E+004 N	4.2E-001	8.5E+000 N
ETHYL METHACRYLATE	97632	9.00E-002 H				y	5.5E+002 N	3.3E+002 N	1.2E+002 N	1.8E+005 N	7.0E+003 N	1.0E+000	2.1E+001 N
FENAMIPHOS	22224926	2.50E-004 I					9.1E+000 N	9.1E-001 N	3.4E-001 N	5.1E+002 N	2.0E+001 N	7.8E-003	1.6E-001 N
FLUOMETURON	2164172	1.30E-002 I					4.7E+002 N	4.7E+001 N	1.8E+001 N	2.7E+004 N	1.0E+003 N		
FLUORINE	7782414	6.00E-002 I					2.2E+003 N	2.2E+002 N	8.1E+001 N	1.2E+005 N	4.7E+003 N		
FOMESAFEN	72178020		1.90E-001 I				3.6E-001 C	3.3E-002 C	1.7E-002 C	3.0E+001 C	3.4E+000 C		
FONOFOS	944229	2.00E-003 I					7.3E+001 N	7.3E+000 N	2.7E+000 N	4.1E+003 N	1.6E+002 N	1.8E-001	3.5E+000 N
FORMALDEHYDE	50000	2.00E-001 I			4.50E-002 I		7.3E+003 N	1.4E-001 C	2.7E+002 N	4.1E+005 N	1.6E+004 N	1.5E+000	3.0E+001 N
FORMIC ACID	64186	2.00E+000 H					7.3E+004 N	7.3E+003 N	2.7E+003 N	4.1E+006 N	1.6E+005 N		
FURAN	110009	1.00E-003 I				y	6.1E+000 N	3.7E+000 N	1.4E+000 N	2.0E+003 N	7.8E+001 N	1.5E-003	3.0E-002 N
FURAZOLIDONE	67458		3.80E+000 H				1.8E-002 C	1.6E-003 C	8.3E-004 C	1.5E+000 C	1.7E-001 C		
FURFURAL	98011	3.00E-003 I		1.00E-002 A			1.1E+002 N	3.7E+001 N	4.1E+000 N	6.1E+003 N	2.3E+002 N	2.3E-002	4.6E-001 N
GLYCIDALDEHYDE	765344	4.00E-004 I		2.90E-004 H			1.5E+001 N	1.1E+000 N	5.4E-001 N	8.2E+002 N	3.1E+001 N		
GLYPHOSATE	1071836	1.00E-001 I					3.7E+003 N	3.7E+002 N	1.4E+002 N	2.0E+005 N	7.8E+003 N	2.6E+001	5.3E+002 N
HEPTACHLOR	76448	5.00E-004 I	4.50E+000 I		4.50E+000 I		1.5E-002 C	1.4E-003 C	7.0E-004 C	1.3E+000 C	1.4E-001 C	4.2E-002	8.4E-001 C
HEPTACHLOR EPOXIDE	1024573	1.30E-005 I	9.10E+000 I		9.10E+000 I		7.4E-003 C	6.9E-004 C	3.5E-004 C	6.3E-001 C	7.0E-002 C	1.2E-003	2.5E-002 C
HEXABROMOBENZENE	87821	2.00E-003 I					7.3E+001 N	7.3E+000 N	2.7E+000 N	4.1E+003 N	1.6E+002 N		
HEXACHLOROBENZENE	118741	8.00E-004 I	1.60E+000 I		1.60E+000 I		4.2E-002 C	3.9E-003 C	2.0E-003 C	3.6E+000 C	4.0E-001 C	2.6E-003	5.2E-002 C
HEXACHLOROBUTADIENE	87683	2.00E-004 H	7.80E-002 I		7.80E-002 I		8.6E-001 C I	8.0E-002 C I	4.0E-002 C I	7.3E+001 C I	8.2E+000 C I	9.2E-002	1.8E+000 C
ALPHA-HCH	319846		6.30E+000 I		6.30E+000 I		1.1E-002 C	9.9E-004 C	5.0E-004 C	9.1E-001 C	1.0E-001 C	4.5E-005	8.9E-004 C
BETA-HCH	319857		1.80E+000 I		1.80E+000 I		3.7E-002 C	3.5E-003 C	1.8E-003 C	3.2E+000 C	3.5E-001 C	1.6E-004	3.1E-003 C
GAMMA-HCH (LINDANE)	58899	3.00E-004 I	1.30E+000 H				5.2E-002 C	4.8E-003 C	2.4E-003 C	4.4E+000 C	4.9E-001 C	2.2E-004	4.3E-003 C
TECHNICAL HCH	608731		1.80E+000 I		1.80E+000 I		3.7E-002 C	3.5E-003 C	1.8E-003 C	3.2E+000 C	3.5E-001 C		
HEXACHLOROCYCLOPENTADIENE	77474	7.00E-003 I		2.00E-005 H			2.6E+002 N	7.3E-002 N	9.5E+000 N	1.4E+004 N	5.5E+002 N	1.0E+002	2.0E+003 N
HEXACHLORODIBENZODIOXIN MIX	19408743		6.20E+003 I		4.55E+003 I		1.1E-005 C	1.4E-006 C	5.1E-007 C	9.2E-004 C	1.0E-004 C		

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Basis: C = Carcinogenic effects N = Noncarcinogenic effects I = RBC at HI of 0.1 < RBC-c

							Risk-based concentrations					Region III SSLs	
							Tap	Ambient		Soil		Soil, for groundwater migration	
		RfDo	CSFo	RfDi	CSFi		water	air	Fish	Industrial	Residential	DAF 1	DAF 20
Chemical	CAS	mg/kg/d	1/mg/kg/d	mg/kg/d	1/mg/kg/d	VOC	ug/l	ug/m3	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
HEXACHLOROETHANE	67721	1.00E-003 I	1.40E-002 I		1.40E-002 I		4.8E+000 C I	4.5E-001 C I	2.3E-001 C I	4.1E+002 C I	4.6E+001 C I	1.8E-002	3.6E-001 C
HEXACHLOROPHENE	70304	3.00E-004 I					1.1E+001 N	1.1E+000 N	4.1E-001 N	6.1E+002 N	2.3E+001 N	1.0E+002	2.0E+003 N
1,6-HEXAMETHYLENE DIISOCYANATE	822060			2.90E-006 I				1.1E-002 N					
HEXANE	110543	6.00E-002 H		5.71E-002 I		y	3.5E+002 N	2.1E+002 N	8.1E+001 N	1.2E+005 N	4.7E+003 N	6.9E-001	1.4E+001 N
2-HEXANONE	591786	4.00E-002 E		1.4E-003 E			1.5E+003 N	5.1E+000 N	5.4E+001 N	8.2E+004 N	3.1E+003 N		
HEXAZINONE	51235042	3.30E-002 I					1.2E+003 N	1.2E+002 N	4.5E+001 N	6.7E+004 N	2.6E+003 N		
HMX	2691410	5.00E-002 I					1.8E+003 N	1.8E+002 N	6.8E+001 N	1.0E+005 N	3.9E+003 N		
HYDRAZINE	302012		3.00E+000 I		1.70E+001 I		2.2E-002 C	3.7E-004 C	1.1E-003 C	1.9E+000 C	2.1E-001 C		
HYDROGEN CHLORIDE	7647010			5.70E-003 I				2.1E+001 N					
HYDROGEN SULFIDE	7783064	3.00E-003 I		2.85E-004 I			1.1E+002 N	1.0E+000 N	4.1E+000 N	6.1E+003 N	2.3E+002 N		
HYDROQUINONE	123319	4.00E-002 H					1.5E+003 N	1.5E+002 N	5.4E+001 N	8.2E+004 N	3.1E+003 N		
IRON	7439896	3.00E-001 E					1.1E+004 N	1.1E+003 N	4.1E+002 N	6.1E+005 N	2.3E+004 N		
ISOBUTANOL	78831	3.00E-001 I				y	1.8E+003 N	1.1E+003 N	4.1E+002 N	6.1E+005 N	2.3E+004 N	5.9E-001	1.2E+001 N
ISOPHORONE	78591	2.00E-001 I	9.50E-004 I				7.0E+001 C	6.6E+000 C	3.3E+000 C	6.0E+003 C	6.7E+002 C	2.1E-002	4.1E-001 C
ISOPROPALIN	33820530	1.50E-002 I					5.5E+002 N	5.5E+001 N	2.0E+001 N	3.1E+004 N	1.2E+003 N		
ISOPROPYL METHYL PHOSPHONIC ACID	1832548	1.00E-001 I					3.7E+003 N	3.7E+002 N	1.4E+002 N	2.0E+005 N	7.8E+003 N		
TETRAETHYLLEAD	78002	1.00E-007 I					3.7E-003 N	3.7E-004 N	1.4E-004 N	2.0E-001 N	7.8E-003 N	4.6E-005	9.2E-004 N
LITHIUM	7439932	2.00E-002 E					7.3E+002 N	7.3E+001 N	2.7E+001 N	4.1E+004 N	1.6E+003 N		
MALATHION	121755	2.00E-002 I					7.3E+002 N	7.3E+001 N	2.7E+001 N	4.1E+004 N	1.6E+003 N	4.0E-001	8.1E+000 N
MALEIC ANHYDRIDE	108316	1.00E-001 I					3.7E+003 N	3.7E+002 N	1.4E+002 N	2.0E+005 N	7.8E+003 N		
MANGANESE-NONFOOD	7439965	2.00E-002 I		1.43E-005 I			7.3E+002 N	5.2E-002 N	2.7E+001 N	4.1E+004 N	1.6E+003 N	4.8E+001	9.5E+002 N
MANGANESE-FOOD	7439965	1.40E-001 I		1.43E-005 I			5.1E+003 N	5.2E-002 N	1.9E+002 N	2.9E+005 N	1.1E+004 N	3.3E+002	6.7E+003 N
MEPHOSFOLAN	950107	9.00E-005 H					3.3E+000 N	3.3E-001 N	1.2E-001 N	1.8E+002 N	7.0E+000 N		
MEPIQUAT CHLORIDE	24307264	3.00E-002 I					1.1E+003 N	1.1E+002 N	4.1E+001 N	6.1E+004 N	2.3E+003 N		
MERCURIC CHLORIDE	7487947	3.00E-004 I					1.1E+001 N	1.1E+000 N	4.1E-001 N	6.1E+002 N	2.3E+001 N		
MERCURY (INORGANIC)	7439976			8.60E-005 I				3.1E-001 N					
METHYLMERCURY	22967926	1.00E-004 I					3.7E+000 N	3.7E-001 N	1.4E-001 N	2.0E+002 N	7.8E+000 N		
METHACRYLONITRILE	126987	1.00E-004 I		2.00E-004 A		y	1.0E+000 N	7.3E-001 N	1.4E-001 N	2.0E+002 N	7.8E+000 N	2.1E-004	4.2E-003 N
METHANOL	67561	5.00E-001 I					1.8E+004 N	1.8E+003 N	6.8E+002 N	1.0E+006 N	3.9E+004 N	3.8E+000	7.5E+001 N
METHIDATHION	950378	1.00E-003 I					3.7E+001 N	3.7E+000 N	1.4E+000 N	2.0E+003 N	7.8E+001 N		
METHOXYCHLOR	72435	5.00E-003 I					1.8E+002 N	1.8E+001 N	6.8E+000 N	1.0E+004 N	3.9E+002 N	1.5E+001	3.1E+002 N
METHYL ACETATE	79209	1.00E+000 H				y	6.1E+003 N	3.7E+003 N	1.4E+003 N	2.0E+006 N	7.8E+004 N	1.2E+000	2.5E+001 N
METHYL ACRYLATE	96333	3.00E-002 A				y	1.8E+002 N	1.1E+002 N	4.1E+001 N	6.1E+004 N	2.3E+003 N	5.0E-001	1.0E+001 N
2-METHYLANILINE	95534		2.40E-001 H				2.8E-001 C	2.6E-002 C	1.3E-002 C	2.4E+001 C	2.7E+000 C	2.8E-004	5.7E-003 C
4-(2-METHYL-4-CHLOROPHENOXY) BUTYRIC ACID	94815	1.00E-002 I					3.7E+002 N	3.7E+001 N	1.4E+001 N	2.0E+004 N	7.8E+002 N		
2-METHYL-4-CHLOROPHENOXYACETIC ACID (MCPA)	94746	5.00E-004 I					1.8E+001 N	1.8E+000 N	6.8E-001 N	1.0E+003 N	3.9E+001 N		
2-(2-METHYL-4-CHLOROPHENOXY)PROPIONIC ACID (MCPP)	93652	1.00E-003 I					3.7E+001 N	3.7E+000 N	1.4E+000 N	2.0E+003 N	7.8E+001 N		
METHYLCYCLOHEXANE	108872			8.60E-001 H		y	6.3E+003 N	3.1E+003 N					
METHYLENE BROMIDE	74953	1.00E-002 A				y	6.1E+001 N	3.7E+001 N	1.4E+001 N	2.0E+004 N	7.8E+002 N	1.5E-002	3.0E-001 N
METHYLENE CHLORIDE	75092	6.00E-002 I	7.50E-003 I	8.60E-001 H	1.65E-003 I	y	4.1E+000 C	3.8E+000 C	4.2E-001 C	7.6E+002 C	8.5E+001 C	9.5E-004	1.9E-002 C
4,4'-METHYLENE BIS(2-CHLOROANILINE)	101144	7.00E-004 H	1.30E-001 H		1.30E-001 H		5.2E-001 C	4.8E-002 C	2.4E-002 C	4.4E+001 C	4.9E+000 C		
4,4'-METHYLENE BIS(N,N'-DIMETHYL)ANILINE	101611		4.60E-002 I				1.5E+000 C	1.4E-001 C	6.9E-002 C	1.2E+002 C	1.4E+001 C		
4,4'-METHYLENEDIPHENYL ISOCYANATE	101688			1.7E-004 I				6.2E-001 N					
METHYL ETHYL KETONE (2-BUTANONE)	78933	6.00E-001 I		2.86E-001 I		y	1.9E+003 N	1.0E+003 N	8.1E+002 N	1.2E+006 N	4.7E+004 N	4.0E-001	7.9E+000 N
METHYL HYDRAZINE	60344		1.10E+000 W				6.1E-002 C	5.7E-003 C	2.9E-003 C	5.2E+000 C	5.8E-001 C		

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							Tap	Ambient		Soil		Soil, for groundwater migration	
Chemical	CAS	RfDo mg/kg/d	CSFo 1/mg/kg/d	RfDi mg/kg/d	CSFi 1/mg/kg/d	VOC	water ug/l	air ug/m3	Fish mg/kg	Industrial mg/kg	Residential mg/kg	DAF 1 mg/kg	DAF 20 mg/kg
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	108101	8 00E-002 H		2.00E-002 A		y	1.4E+002 N	7.3E+001 N	1.1E+002 N	1.6E+005 N	6.3E+003 N	6.5E-002	1.3E+000 N
METHYL METHACRYLATE	80626	1.40E+000 I		2.00E-001 I		y	1.4E+003 N	7.3E+002 N	1.9E+003 N	2 9E+006 N	1.1E+005 N	3.2E-001	6.5E+000 N
2-METHYL-5-NITROANILINE	99558		3.30E-002 H				2.0E+000 C	1 9E-001 C	9 6E-002 C	1 7E+002 C	1.9E+001 C		
METHYL PARATHION	298000	2 50E-004 I					9.1E+000 N	9 1E-001 N	3 4E-001 N	5 1E+002 N	2.0E+001 N	4.3E-003	8.6E-002 N
2-METHYLPHENOL	95487	5 00E-002 I					1 8E+003 N	1.8E+002 N	6 8E+001 N	1 0E+005 N	3.9E+003 N		
3-METHYLPHENOL	108394	5.00E-002 I					1.8E+003 N	1.8E+002 N	6.8E+001 N	1.0E+005 N	3.9E+003 N		
4-METHYLPHENOL	106445	5 00E-003 H					1.8E+002 N	1 8E+001 N	6 8E+000 N	1 0E+004 N	3.9E+002 N		
METHYLSTYRENE MIX	25013154	6 00E-003 A		1.00E-002 A		y	5.5E+001 N	3.7E+001 N	8.1E+000 N	1 2E+004 N	4.7E+002 N	5.1E-002	1 0E+000 N
ALPHA-METHYLSTYRENE	98839	7.00E-002 A				y	4 3E+002 N	2 6E+002 N	9 5E+001 N	1 4E+005 N	5.5E+003 N	4.0E-001	7.9E+000 N
METHYL TERT-BUTYL ETHER	1634044			8.57E-001 I		y	6 3E+003 N	3 1E+003 N				1.4E+000	2.8E+001 N
METOLACHLOR (DUAL)	51218452	1 50E-001 I					5 5E+003 N	5.5E+002 N	2 0E+002 N	3 1E+005 N	1 2E+004 N		
MIREX	2385855	2.00E-004 I					7.3E+000 N	7.3E-001 N	2.7E-001 N	4.1E+002 N	1.6E+001 N		
MOLYBDENUM	7439987	5E-003 I					1.8E+002 N	1.8E+001 N	6 8E+000 N	1 0E+004 N	3.9E+002 N		
MONOCHLORAMINE	10599903	1E-001 I		1.00E-001 H			3.7E+003 N	3.7E+002 N	1.4E+002 N	2 0E+005 N	7.8E+003 N		
NALED	300765	2E-003 I					7.3E+001 N	7.3E+000 N	2 7E+000 N	4 1E+003 N	1.6E+002 N		
NICKEL REFINERY DUST					8.4E-001 I			7.5E-003 C					
NICKEL	7440020	2 00E-002 I					7.3E+002 N	7.3E+001 N	2.7E+001 N	4 1E+004 N	1 6E+003 N		
NITRATE	14797558	1.60E+000 I					5.8E+004 N	5.8E+003 N	2 2E+003 N	3.3E+006 N	1.3E+005 N		
NITRIC OXIDE	10102439	1 00E-001 W				y	6.1E+002 N	3.7E+002 N	1 4E+002 N	2.0E+005 N	7.8E+003 N		
NITRITE	14797650	1.00E-001 I					3.7E+003 N	3.7E+002 N	1 4E+002 N	2.0E+005 N	7.8E+003 N		
2-NITROANILINE	88744			5.70E-005 H				2.1E-001 N					
NITROBENZENE	98953	5 00E-004 I		6 00E-004 A		y	3.5E+000 N	2.2E+000 N	6 8E-001 N	1.0E+003 N	3.9E+001 N	1.2E-003	2 3E-002 N
NITROFURANTOIN	67209	7 00E-002 H					2.6E+003 N	2.6E+002 N	9.5E+001 N	1 4E+005 N	5.5E+003 N		
NITROFURAZONE	59870		1.50E+000 H				4.5E-002 C	4 2E-003 C	2.1E-003 C	3.8E+000 C	4.3E-001 C		
NITROGEN DIOXIDE	10102440	1.00E+000 W				y	6.1E+003 N	3.7E+003 N	1.4E+003 N	2 0E+006 N	7 8E+004 N		
NITROGLYCERIN	55630		1.4E-002 E				4 8E+000 C	4.5E-001 C	2 3E-001 C	4.1E+002 C	4.6E+001 C		
4-NITROPHENOL	100027	8.00E-003 E					2.9E+002 N	2 9E+001 N	1 1E+001 N	1.6E+004 N	6.3E+002 N	8.7E-002	1.7E+000 N
2-NITROPROPANE	79469			5 70E-003 I	9 40E+000 H	y	1 3E-003 C	6.7E-004 C				3 2E-007	6 4E-006 C
N-NITROSO-DI-N-BUTYLAMINE	924163		5 40E+000 I		5 60E+000 I	y	1.9E-003 C	1 1E-003 C	5 8E-004 C	1 1E+000 C	1 2E-001 C	1.4E-006	2.7E-005 C
N-NITROSODIETHANOLAMINE	1116547		2 80E+000 I				2.4E-002 C	2.2E-003 C	1.1E-003 C	2 0E+000 C	2 3E-001 C		
N-NITROSODIETHYLAMINE	55185		1 50E+002 I		1 50E+002 I		4.5E-004 C	4 2E-005 C	2 1E-005 C	3 8E-002 C	4.3E-003 C	1.1E-007	2 3E-006 C
N-NITROSODIMETHYLAMINE	62759		5 10E+001 I		5 10E+001 I		1.3E-003 C	1.2E-004 C	6 2E-005 C	1 1E-001 C	1.3E-002 C	2.8E-007	5 7E-006 C
N-NITROSODIPHENYLAMINE	86306		4.90E-003 I				1.4E+001 C	1.3E+000 C	6.4E-001 C	1 2E+003 C	1.3E+002 C	3 8E-002	7.6E-001 C
N-NITROSODIPROPYLAMINE	621647		7.00E+000 I				9.6E-003 C	8 9E-004 C	4 5E-004 C	8 2E-001 C	9 1E-002 C	2 4E-006	4.7E-005 C
N-NITROSO-N-ETHYLUREA	759739		1.40E+002 H				4.6E-004 C	4 5E-005 C	2 3E-005 C	4 1E-002 C	4.6E-003 C		
N-NITROSO-N-METHYLETHYLAMINE	10595956		2.20E+001 I				3.0E-003 C	2 8E-004 C	1.4E-004 C	2 6E-001 C	2.9E-002 C		
N-NITROSOPYRROLIDINE	930552		2 10E+000 I		2.10E+000 I		3 2E-002 C	3 0E-003 C	1 5E-003 C	2 7E+000 C	3 0E-001 C		
M-NITROTOLUENE	99081	2 00E-002 E				y	1.2E+002 N	7.3E+001 N	2 7E+001 N	4 1E+004 N	1.6E+003 N		
O-NITROTOLUENE	88722	1.00E-002 H				y	6.1E+001 N	3.7E+001 N	1.4E+001 N	2.0E+004 N	7.8E+002 N		
P-NITROTOLUENE	99990	1 00E-002 H				y	6.1E+001 N	3 7E+001 N	1.4E+001 N	2 0E+004 N	7.8E+002 N		
NUSTAR	85509199	7 00E-004 I					2.6E+001 N	2 6E+000 N	9 5E-001 N	1 4E+003 N	5.5E+001 N		
ORYZALIN	19044883	5 00E-002 I					1.8E+003 N	1.8E+002 N	6.8E+001 N	1 0E+005 N	3.9E+003 N		
OXADIAZON	19666309	5 00E-003 I					1.8E+002 N	1 8E+001 N	6 8E+000 N	1 0E+004 N	3 9E+002 N		
OXAMYL	23135220	2 50E-002 I					9.1E+002 N	9 1E+001 N	3 4E+001 N	5 1E+004 N	2.0E+003 N	1 9E-001	3 8E+000 N
OXYFLUORFEN	42874033	3.00E-003 I					1.1E+002 N	1 1E+001 N	4 1E+000 N	6 1E+003 N	2.3E+002 N		

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Basis C = Carcinogenic effects N = Noncarcinogenic effects I = RBC at HI of 0.1 < RBC-c

							Risk-based concentrations					Region III SSLs	
							Tap	Ambient		Soil		Soil, for groundwater migration	
Chemical	CAS	RfDo mg/kg/d	CSFo 1/mg/kg/d	RfDi mg/kg/d	CSFi 1/mg/kg/d	VOC	water ug/l	air ug/m3	Fish mg/kg	Industrial mg/kg	Residential mg/kg	DAF 1 mg/kg	DAF 20 mg/kg
PARAQUAT DICHLORIDE	1910425	4.50E-003 I					1.6E+002 N	1.6E+001 N	6.1E+000 N	9.2E+003 N	3.5E+002 N		
PARATHION	56382	6.00E-003 H					2.2E+002 N	2.2E+001 N	8.1E+000 N	1.2E+004 N	4.7E+002 N	5.0E-001	1.0E+001 N
PENTACHLOROBENZENE	608935	8.00E-004 I					2.9E+001 N	2.9E+000 N	1.1E+000 N	1.6E+003 N	6.3E+001 N	1.0E+000	2.0E+001 N
PENTACHLORONITROBENZENE	82688	3.00E-003 I	2.60E-001 H				2.6E-001 C	2.4E-002 C	1.2E-002 C	2.2E+001 C	2.6E+000 C	4.1E-003	8.2E-002 C
PENTACHLOROPHENOL	87865	3.00E-002 I	1.20E-001 I				5.6E-001 C	5.2E-002 C	2.6E-002 C	4.8E+001 C	5.3E+000 C		
PERMETHRIN	52645531	5.00E-002 I					1.8E+003 N	1.8E+002 N	6.8E+001 N	1.0E+005 N	3.9E+003 N	1.2E+002	2.4E+003 N
PHENOL	108952	6.00E-001 I					2.2E+004 N	2.2E+003 N	8.1E+002 N	1.2E+006 N	4.7E+004 N	6.7E+000	1.3E+002 N
M-PHENYLENEDIAMINE	108452	6.00E-003 I					2.2E+002 N	2.2E+001 N	8.1E+000 N	1.2E+004 N	4.7E+002 N	4.9E-002	9.8E-001 N
O-PHENYLENEDIAMINE	95545		4.70E-002 H				1.4E+000 C	1.3E-001 C	6.7E-002 C	1.2E+002 C	1.4E+001 C		
P-PHENYLENEDIAMINE	106503	1.90E-001 H					6.9E+003 N	6.9E+002 N	2.6E+002 N	3.9E+005 N	1.6E+004 N		
2-PHENYLPHENOL	90437		1.90E-003 H				3.5E+001 C	3.3E+000 C	1.7E+000 C	3.0E+003 C	3.4E+002 C		
PHOSPHINE	7803512	3.00E-004 I		8.60E-005 I			1.1E+001 N	3.1E-001 N	4.1E-001 N	6.1E+002 N	2.3E+001 N		
PHOSPHORIC ACID	7664382			2.90E-003 I				1.1E+001 N					
PHOSPHORUS (WHITE)	7723140	2.00E-005 I					7.3E-001 N	7.3E-002 N	2.7E-002 N	4.1E+001 N	1.6E+000 N		
P-PHTHALIC ACID	100210	1.00E+000 H					3.7E+004 N	3.7E+003 N	1.4E+003 N	2.0E+006 N	7.8E+004 N		
PHTHALIC ANHYDRIDE	85449	2.00E+000 I		3.43E-002 H			7.3E+004 N	1.3E+002 N	2.7E+003 N	4.1E+006 N	1.6E+005 N	2.6E+001	5.2E+002 N
POLYBROMINATED BIPHENYLS		7.00E-006 H	8.90E+000 H				7.5E-003 C	7.0E-004 C	3.5E-004 C	6.4E-001 C	7.2E-002 C !		
POLYCHLORINATED BIPHENYLS	1336363		2.00E+000 I		2.00E+000 I		3.3E-002 C	3.1E-003 C	1.6E-003 C	2.9E+000 C	3.2E-001 C	2.1E-002	4.1E-001 C
AROCLOR-1016	12674112	7.00E-005 I	7.00E-002 I		7.00E-002 I		9.6E-001 C !	8.9E-002 C !	4.5E-002 C !	8.2E+001 C !	5.5E+000 N	2.1E-001	4.2E+000 C
AROCLOR-1221	11104282		2.00E+000 I		2.00E+000 I		3.3E-002 C	3.1E-003 C	1.6E-003 C	2.9E+000 C	3.2E-001 C		
AROCLOR-1232	11141165		2.00E+000 I		2.00E+000 I		3.3E-002 C	3.1E-003 C	1.6E-003 C	2.9E+000 C	3.2E-001 C		
AROCLOR-1242	53469219		2.00E+000 I		2.00E+000 I		3.3E-002 C	3.1E-003 C	1.6E-003 C	2.9E+000 C	3.2E-001 C		
AROCLOR-1248	12672296		2.00E+000 I		2.00E+000 I		3.3E-002 C	3.1E-003 C	1.6E-003 C	2.9E+000 C	3.2E-001 C		
AROCLOR-1254	11097691	2.00E-005 I	2.00E+000 I		2.00E+000 I		3.3E-002 C	3.1E-003 C	1.6E-003 C	2.9E+000 C	3.2E-001 C !	5.4E-002	1.1E+000 C
AROCLOR-1260	11096825		2.00E+000 I		2.00E+000 I		3.3E-002 C	3.1E-003 C	1.6E-003 C	2.9E+000 C	3.2E-001 C		
POLYCHLORINATED TERPHENYLS	61788338		4.50E+000 E				1.5E-002 C	1.4E-003 C	7.0E-004 C	1.3E+000 C	1.4E-001 C		
POLYNUCLEAR AROMATIC HYDROCARBONS.													
ACENAPHTHENE	83329	6.00E-002 I				y	3.7E+002 N	2.2E+002 N	8.1E+001 N	1.2E+005 N	4.7E+003 N	5.2E+000	1.0E+002 N
ANTHRACENE	120127	3.00E-001 I				y	1.8E+003 N	1.1E+003 N	4.1E+002 N	6.1E+005 N	2.3E+004 N	2.3E+001	4.7E+002 N
BENZ[A]ANTHRACENE	56553		7.30E-001 E				9.2E-002 C	8.6E-003 C	4.3E-003 C	7.8E+000 C	8.7E-001 C	7.3E-002	1.5E+000 C
BENZO[B]FLUORANTHENE	205992		7.30E-001 E				9.2E-002 C	8.6E-003 C	4.3E-003 C	7.8E+000 C	8.7E-001 C	2.3E-001	4.5E+000 C
BENZO[K]FLUORANTHENE	207089		7.30E-002 E				9.2E-001 C	8.6E-002 C	4.3E-002 C	7.8E+001 C	8.7E+000 C	2.3E+000	4.5E+001 C
BENZO[A]PYRENE	50328		7.30E+000 I		3.10E+000 E		9.2E-003 C	2.0E-003 C	4.3E-004 C	7.8E-001 C	8.7E-002 C	1.9E-002	3.7E-001 C
CARBAZOLE	86748		2.00E-002 H				3.3E+000 C	3.1E-001 C	1.6E-001 C	2.9E+002 C	3.2E+001 C	2.3E-002	4.7E-001 C
CHRYSENE	218019		7.30E-003 E				9.2E+000 C	8.6E-001 C	4.3E-001 C	7.8E+002 C	8.7E+001 C	7.3E+000	1.5E+002 C
DIBENZ[A,H]ANTHRACENE	53703		7.30E+000 E				9.2E-003 C	8.6E-004 C	4.3E-004 C	7.8E-001 C	8.7E-002 C	7.0E-002	1.4E+000 C
DIBENZOFURAN	132649	4.00E-003 E				y	2.4E+001 N	1.5E+001 N	5.4E+000 N	8.2E+003 N	3.1E+002 N	3.8E-001	7.7E+000 N
FLUORANTHENE	206440	4.00E-002 I					1.5E+003 N	1.5E+002 N	5.4E+001 N	8.2E+004 N	3.1E+003 N	3.1E+002	6.3E+003 N
FLUORENE	86737	4.00E-002 I				y	2.4E+002 N	1.5E+002 N	5.4E+001 N	8.2E+004 N	3.1E+003 N	6.8E+000	1.4E+002 N
INDENO[1,2,3-C,D]PYRENE	193395		7.30E-001 E				9.2E-002 C	8.6E-003 C	4.3E-003 C	7.8E+000 C	8.7E-001 C	6.4E-001	1.3E+001 C
2-METHYLNAPHTHALENE	91576	2.00E-002 E				y	1.2E+002 N	7.3E+001 N	2.7E+001 N	4.1E+004 N	1.6E+003 N	1.1E+000	2.2E+001 N
NAPHTHALENE	91203	2.00E-002 I		9.00E-004 I		y	6.5E+000 N	3.3E+000 N	2.7E+001 N	4.1E+004 N	1.6E+003 N	7.7E-003	1.5E-001 N
PYRENE	129000	3.00E-002 I				y	1.8E+002 N	1.1E+002 N	4.1E+001 N	6.1E+004 N	2.3E+003 N	3.4E+001	6.8E+002 N
PROMETON	1610180	1.50E-002 I					5.5E+002 N	5.5E+001 N	2.0E+001 N	3.1E+004 N	1.2E+003 N		
PROMETRYN	7287196	4.00E-003 I					1.5E+002 N	1.5E+001 N	5.4E+000 N	8.2E+003 N	3.1E+002 N		

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Chemical	CAS	RfDo mg/kg/d	CSFo 1/mg/kg/d	RfDi mg/kg/d	CSFi 1/mg/kg/d	VOC	Tap water ug/l	Ambient air ug/m3	Fish mg/kg	Soil Industrial mg/kg	Residential mg/kg	DAF 1 mg/kg	DAF 20 mg/kg
PROPACHLOR	1918167	1.30E-002 I					4 7E+002 N	4.7E+001 N	1.8E+001 N	2.7E+004 N	1.0E+003 N		
PROPANIL	709988	5.00E-003 I					1.8E+002 N	1.8E+001 N	6.8E+000 N	1 0E+004 N	3 9E+002 N		
PROPARGITE	2312358	2.00E-002 I					7.3E+002 N	7.3E+001 N	2.7E+001 N	4 1E+004 N	1.6E+003 N		
N-PROPYLBENZENE	103651	4.00E-002 E				y	2.4E+002 N	1.5E+002 N	5 4E+001 N	8 2E+004 N	3.1E+003 N	1.4E+000	2.8E+001 N
PROPYLENE GLYCOL	57556	2.00E+001 H					7.3E+005 N	7.3E+004 N	2 7E+004 N	4.1E+007 N	1.6E+006 N		
PROPYLENE GLYCOL, MONOETHYL ETHER	52125538	7.00E-001 H					2.6E+004 N	2.6E+003 N	9.5E+002 N	1.4E+006 N	5.5E+004 N		
PROPYLENE GLYCOL, MONOMETHYL ETHER	107982	7.00E-001 H		5 70E-001 I			2 6E+004 N	2.1E+003 N	9.5E+002 N	1 4E+006 N	5 5E+004 N		
PURSUIT	81335775	2.50E-001 I					9.1E+003 N	9.1E+002 N	3.4E+002 N	5.1E+005 N	2.0E+004 N		
PYRIDINE	110861	1.00E-003 I					3.7E+001 N	3.7E+000 N	1.4E+000 N	2.0E+003 N	7.8E+001 N		
QUINOLINE	91225		1.20E+001 H				5.6E-003 C	5.2E-004 C	2 6E-004 C	4 8E-001 C	5 3E-002 C		
RDX	121824	3 00E-003 I	1 10E-001 I				6 1E-001 C	5.7E-002 C	2 9E-002 C	5.2E+001 C	5 8E+000 C		
RESMETHRIN	10453868	3.00E-002 I					1.1E+003 N	1.1E+002 N	4.1E+001 N	6.1E+004 N	2 3E+003 N		
RONNEL	299843	5.00E-002 H					1 8E+003 N	1.8E+002 N	6.8E+001 N	1.0E+005 N	3 9E+003 N		
ROTENONE	83794	4.00E-003 I					1.5E+002 N	1.5E+001 N	5.4E+000 N	8 2E+003 N	3.1E+002 N		
SELENIOUS ACID	7783008	5.00E-003 I					1.8E+002 N	1.8E+001 N	6.8E+000 N	1 0E+004 N	3 9E+002 N		
SELENIUM	7782492	5.00E-003 I					1.8E+002 N	1.8E+001 N	6.8E+000 N	1 0E+004 N	3 9E+002 N	9 5E-001	1.9E+001 N
SILVER	7440224	5 00E-003 I					1.8E+002 N	1 8E+001 N	6 8E+000 N	1 0E+004 N	3 9E+002 N	1 6E+000	3.1E+001 N
SIMAZINE	122349	5.00E-003 I	1.20E-001 H				5.6E-001 C	5.2E-002 C	2.6E-002 C	4 8E+001 C	5.3E+000 C	1.7E-004	3.3E-003 C
SODIUM AZIDE	26628228	4.00E-003 I					1.5E+002 N	1.5E+001 N	5.4E+000 N	8 2E+003 N	3 1E+002 N		
SODIUM DIETHYLDITHIOCARBAMATE	148185	3.00E-002 I	2.70E-001 H				2.5E-001 C	2.3E-002 C	1.2E-002 C	2 1E+001 C	2 4E+000 C		
STRONTIUM, STABLE	7440246	6.00E-001 I					2.2E+004 N	2.2E+003 N	8.1E+002 N	1.2E+006 N	4.7E+004 N	7.7E+002	1.5E+004 N
STRYCHNINE	57249	3.00E-004 I					1.1E+001 N	1.1E+000 N	4.1E-001 N	6 1E+002 N	2 3E+001 N	8 3E-003	1.7E-001 N
STYRENE	100425	2.00E-001 I		2.86E-001 I		y	1.6E+003 N	1.0E+003 N	2.7E+002 N	4 1E+005 N	1 6E+004 N	2 9E+000	5.7E+001 N
2,3,7,8-TETRACHLORODIBENZODIOXIN	1746016		1.50E+005 H		1.50E+005 H		4 5E-007 C	4.2E-008 C	2.1E-008 C	3.8E-005 C	4.3E-006 C	4.3E-007	8 6E-006 C
1,2,4,5-TETRACHLOROBENZENE	95943	3.00E-004 I					1.1E+001 N	1.1E+000 N	4.1E-001 N	6 1E+002 N	2.3E+001 N	3.3E-002	6.6E-001 N
1,1,1,2-TETRACHLOROETHANE	630206	3.00E-002 I	2.60E-002 I		2 60E-002 I	y	4.1E-001 C	2.4E-001 C	1 2E-001 C	2 2E+002 C	2.5E+001 C	2.0E-004	4.0E-003 C
1,1,2,2-TETRACHLOROETHANE	79345	6.00E-002 E	2.00E-001 I		2.00E-001 I	y	5.3E-002 C	3.1E-002 C	1.6E-002 C	2 9E+001 C	3 2E+000 C	3.4E-005	6.8E-004 C
TETRACHLOROETHENE	127184	1.00E-002 I	5 20E-002 E	1 4E-001 E	2 00E-003 E	y	1.1E+000 C	3.1E+000 C	6 1E-002 C	1.1E+002 C	1 2E+001 C	2.4E-003	4.8E-002 C
2,3,4,6-TETRACHLOROPHENOL	58902	3.00E-002 I					1 1E+003 N	1.1E+002 N	4.1E+001 N	6 1E+004 N	2 3E+003 N		
P,A,A,A-TETRACHLOROTOLUENE	5216251		2 00E+001 H				3.3E-003 C	3.1E-004 C	1.6E-004 C	2.9E-001 C	3 2E-002 C		
1,1,1,2-TETRAFLUOROETHANE	811972			2 29E+001 I		y	1 7E+005 N	8.4E+004 N					
TETRAHYDROFURAN	109999	2.00E-001 E	7 6E-003 E	8 6E-002 E	6.8E-003 E		8.8E+000 C	9.2E-001 C	4 2E-001 C	7 5E+002 C	8 4E+001 C		
TETRYL	479458	1.00E-002 H					3.7E+002 N	3.7E+001 N	1.4E+001 N	2.0E+004 N	7.8E+002 N		
THALLIC OXIDE	1314326	7.00E-005 W					2 6E+000 N	2.6E-001 N	9.5E-002 N	1 4E+002 N	5 5E+000 N		
THALLIUM	7440280	7.00E-005 O					2.6E+000 N	2 6E-001 N	9.5E-002 N	1.4E+002 N	5.5E+000 N	1 8E-001	3 6E+000 N
THALLIUM ACETATE	563688	9.00E-005 I					3.3E+000 N	3 3E-001 N	1.2E-001 N	1 8E+002 N	7 0E+000 N		
THALLIUM CARBONATE	6533739	8.00E-005 I					2 9E+000 N	2 9E-001 N	1 1E-001 N	1 6E+002 N	6 3E+000 N		
THALLIUM CHLORIDE	7791120	8.00E-005 I					2 9E+000 N	2.9E-001 N	1 1E-001 N	1.6E+002 N	6 3E+000 N		
THALLIUM NITRATE	10102451	9.00E-005 I					3.3E+000 N	3.3E-001 N	1 2E-001 N	1 8E+002 N	7.0E+000 N		
THALLIUM SULFATE (2:1)	7446186	8.00E-005 I					2 9E+000 N	2 9E-001 N	1 1E-001 N	1.6E+002 N	6 3E+000 N		
THIOBENCARB	28249776	1 00E-002 I					3.7E+002 N	3.7E+001 N	1 4E+001 N	2 0E+004 N	7 8E+002 N		
TIN	7440315	6 00E-001 H					2 2E+004 N	2 2E+003 N	8.1E+002 N	1 2E+006 N	4 7E+004 N		

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Basis C = Carcinogenic effects N = Noncarcinogenic effects I = RBC at HI of 0.1 < RBC-c

Chemical	CAS	RfDo mg/kg/d	CSFo 1/mg/kg/d	RfDi mg/kg/d	CSFi 1/mg/kg/d	VOC	Risk-based concentrations: Tap water ug/l	Ambient air ug/m3	Fish mg/kg	Soil Industrial mg/kg	Residential mg/kg	Region III SSLs, Soil, for groundwater migration: DAF 1 mg/kg	DAF 20 mg/kg
TITANIUM	7440326	4.00E+000 E		8.60E-003 E			1.5E+005 N	3.1E+001 N	5.4E+003 N	8.2E+006 N	3.1E+005 N		
TITANIUM DIOXIDE	13463677	4.00E+000 E		8.60E-003 E			1.5E+005 N	3.1E+001 N	5.4E+003 N	8.2E+006 N	3.1E+005 N		
TOLUENE	108883	2.00E-001 I		1.14E-001 I		y	7.5E+002 N	4.2E+002 N	2.7E+002 N	4.1E+005 N	1.6E+004 N	4.4E-001	8.8E+000 N
TOLUENE-2,4-DIAMINE	95807		3.20E+000 H				2.1E-002 C	2.0E-003 C	9.9E-004 C	1.8E+000 C	2.0E-001 C		
TOLUENE-2,5-DIAMINE	95705	6.00E-001 H					2.2E+004 N	2.2E+003 N	8.1E+002 N	1.2E+006 N	4.7E+004 N		
TOLUENE-2,6-DIAMINE	823405	2.00E-001 H					7.3E+003 N	7.3E+002 N	2.7E+002 N	4.1E+005 N	1.6E+004 N		
P-TOLUIDINE	106490		1.90E-001 H				3.5E-001 C	3.3E-002 C	1.7E-002 C	3.0E+001 C	3.4E+000 C	3.0E-004	5.9E-003 C
TOXAPHENE	8001352		1.10E+000 I		1.10E+000 I		6.1E-002 C	5.7E-003 C	2.9E-003 C	5.2E+000 C	5.8E-001 C	3.1E-002	6.3E-001 C
1,2,4-TRIBROMOBENZENE	615543	5.00E-003 I					1.8E+002 N	1.8E+001 N	6.8E+000 N	1.0E+004 N	3.9E+002 N		
TRIBUTYLTIN OXIDE	56359	3.00E-004 I					1.1E+001 N	1.1E+000 N	4.1E-001 N	6.1E+002 N	2.3E+001 N		
2,4,6-TRICHLOROANILINE	634935		3.40E-002 H				2.0E+000 C	1.8E-001 C	9.3E-002 C	1.7E+002 C	1.9E+001 C		
1,2,4-TRICHLOROBENZENE	120821	1.00E-002 I		5.70E-002 H		y	1.9E+002 N	2.1E+002 N	1.4E+001 N	2.0E+004 N	7.8E+002 N	3.8E-001	7.5E+000 N
1,1,1-TRICHLOROETHANE	71556	2.80E-001 E		6.30E-001 E		y	3.2E+003 N	2.3E+003 N	3.8E+002 N	5.7E+005 N	2.2E+004 N	3.0E+000	6.0E+001 N
1,1,2-TRICHLOROETHANE	79005	4.00E-003 I	5.70E-002 I		5.60E-002 I	y	1.9E-001 C	1.1E-001 C	5.5E-002 C	1.0E+002 C	1.1E+001 C	3.9E-005	7.8E-004 C
TRICHLOROETHENE	79016	6.00E-003 E	1.10E-002 E		6.00E-003 E	y	1.6E+000 C	1.0E+000 C	2.9E-001 C	5.2E+002 C	5.8E+001 C I	7.7E-004	1.5E-002 C
TRICHLOROFLUOROMETHANE	75694	3.00E-001 I		2.00E-001 A		y	1.3E+003 N	7.3E+002 N	4.1E+002 N	6.1E+005 N	2.3E+004 N	1.1E+000	2.3E+001 N
2,4,5-TRICHLOROPHENOL	95954	1.00E-001 I					3.7E+003 N	3.7E+002 N	1.4E+002 N	2.0E+005 N	7.8E+003 N		
2,4,6-TRICHLOROPHENOL	88062		1.10E-002 I		1.00E-002 I		6.1E+000 C	6.3E-001 C	2.9E-001 C	5.2E+002 C	5.8E+001 C		
2,4,5-T	93765	1.00E-002 I					3.7E+002 N	3.7E+001 N	1.4E+001 N	2.0E+004 N	7.8E+002 N	9.8E-002	2.0E+000 N
2-(2,4,5-TRICHLOROPHENOXY)PROPIONIC ACID	93721	8.00E-003 I					2.9E+002 N	2.9E+001 N	1.1E+001 N	1.6E+004 N	6.3E+002 N	1.1E+000	2.1E+001 N
1,1,2-TRICHLOROPROPANE	598776	5.00E-003 I				y	3.0E+001 N	1.8E+001 N	6.8E+000 N	1.0E+004 N	3.9E+002 N	1.2E-002	2.5E-001 N
1,2,3-TRICHLOROPROPANE	96184	6.00E-003 I	2.00E+000 E	1.4E-003 E		y	5.3E-003 C	3.1E-003 C	1.6E-003 C	2.9E+000 C	3.2E-001 C	1.8E-006	3.6E-005 C
1,2,3-TRICHLOROPROPENE	96195	5.00E-003 H				y	3.0E+001 N	1.8E+001 N	6.8E+000 N	1.0E+004 N	3.9E+002 N	1.2E-002	2.5E-001 N
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76131	3.00E+001 I		8.60E+000 H		y	5.9E+004 N	3.1E+004 N	4.1E+004 N	6.1E+007 N	2.3E+006 N	1.2E+002	2.3E+003 N
1,2,4-TRIMETHYLBENZENE	95636	5.00E-002 E		1.70E-003 E		y	1.2E+001 N	6.2E+000 N	6.8E+001 N	1.0E+005 N	3.9E+003 N		
1,3,5-TRIMETHYLBENZENE	108678	5.00E-002 E		1.70E-003 E		y	1.2E+001 N	6.2E+000 N	6.8E+001 N	1.0E+005 N	3.9E+003 N		
TRIMETHYL PHOSPHATE	512561		3.70E-002 H				1.8E+000 C	1.7E-001 C	8.5E-002 C	1.5E+002 C	1.7E+001 C		
1,3,5-TRINITROBENZENE	99354	3.00E-002 I					1.1E+003 N	1.1E+002 N	4.1E+001 N	6.1E+004 N	2.3E+003 N		
2,4,6-TRINITROTOLUENE	118967	5.00E-004 I	3.00E-002 I				2.2E+000 C I	2.1E-001 C I	1.1E-001 C I	1.9E+002 C I	2.1E+001 C I		
**URANIUM (SOLUBLE SALTS; from IRIS)	7440611	3.00E-003 I					1.1E+002 N	1.1E+001 N	4.1E+000 N	6.1E+003 N	2.3E+002 N		
**URANIUM (SOLUBLE SALTS; provisional)	7440611	2.00E-004 E					7.3E+000 N	7.3E-001 N	2.7E-001 N	4.1E+002 N	1.6E+001 N		
VANADIUM	7440622	7.00E-003 H					2.6E+002 N	2.6E+001 N	9.5E+000 N	1.4E+004 N	5.5E+002 N	2.6E+002	5.1E+003 N
VANADIUM PENTOXIDE	1314621	9.00E-003 I					3.3E+002 N	3.3E+001 N	1.2E+001 N	1.8E+004 N	7.0E+002 N		
VANADIUM SULFATE	16785812	2.00E-002 H					7.3E+002 N	7.3E+001 N	2.7E+001 N	4.1E+004 N	1.6E+003 N		
VINCLOZOLIN	50471448	2.50E-002 I					9.1E+002 N	9.1E+001 N	3.4E+001 N	5.1E+004 N	2.0E+003 N		
VINYL ACETATE	108054	1.00E+000 H		5.71E-002 I		y	4.1E+002 N	2.1E+002 N	1.4E+003 N	2.0E+006 N	7.8E+004 N	8.7E-002	1.7E+000 N
**VINYL CHLORIDE: lifetime	75014	3.00E-003 I	1.50E+000 I	2.8E-002 I	3.00E-002 I	y	4.0E-002 C	2.1E-001 C	2.1E-003 C	3.8E+000 C	4.3E-001 C	1.7E-005	3.3E-004 C
**VINYL CHLORIDE: adult	75014	3.00E-003 I	7.50E-001 I	2.8E-002 I	1.5E-002 I	y	8.1E-002 C	4.2E-001 C	4.2E-003 C	7.6E+000 C	8.5E-001 C	3.3E-005	6.6E-004 C
WARFARIN	81812	3.00E-004 I					1.1E+001 N	1.1E+000 N	4.1E-001 N	6.1E+002 N	2.3E+001 N	2.2E-002	4.4E-001 N
M-XYLENE	108383	2.00E+000 H				y	1.2E+004 N	7.3E+003 N	2.7E+003 N	4.1E+006 N	1.6E+005 N	1.3E+001	2.5E+002 N
O-XYLENE	95476	2.00E+000 H				y	1.2E+004 N	7.3E+003 N	2.7E+003 N	4.1E+006 N	1.6E+005 N	1.1E+001	2.3E+002 N
P-XYLENE	106423					y							

Sources I = IRIS H = HEAST A = HEAST Alternate W = Withdrawn from IRIS or HEAST E = EPA-NCEA provisional value O = other							Basis C = Carcinogenic effects N = Noncarcinogenic effects I = RBC at HI of 0.1 < RBC-c Risk-based concentrations					Region III SSLs	
												Soil, for groundwater migration	
Chemical	CAS	RfDo mg/kg/d	CSFo 1/mg/kg/d	RfDi mg/kg/d	CSFi 1/mg/kg/d	VOC	Tap water ug/l	Ambient air ug/m3	Fish mg/kg	Soil Industrial mg/kg	Residential mg/kg	DAF 1 mg/kg	DAF 20 mg/kg
XYLENES	1330207	2.00E+000 I				y	1 2E+004 N	7 3E+003 N	2 7E+003 N	4 1E+006 N	1.6E+005 N	8 5E+000	1.7E+002 N
ZINC	7440666	3 00E-001 I					1.1E+004 N	1 1E+003 N	4.1E+002 N	6.1E+005 N	2 3E+004 N	6.8E+002	1.4E+004 N
ZINC PHOSPHIDE	1314847	3E-004 I					1.1E+001 N	1.1E+000 N	4.1E-001 N	6.1E+002 N	2.3E+001 N		
ZINEB	12122677	5E-002 I					1.6E+003 N	1.8E+002 N	6.8E+001 N	1.0E+005 N	3.9E+003 N		

A-175

APPENDIX E

FEDERAL AMBIENT WATER QUALITY CRITERIA

federal register

Thursday
December 10, 1998

Part IV

Environmental Protection Agency

National Recommended Water Quality Criteria; Notice; Republication

ENVIRONMENTAL PROTECTION AGENCY

[FRL–OW–6186–6a]

National Recommended Water Quality Criteria; Republication

Editorial Note: FR Doc. 98-30272 was originally published as Part IV (63 FR 67548-67558) in the issue of Monday, December 7, 1998. At the request of the agency, due to incorrect footnote identifiers in the tables, the corrected document is being republished in its entirety.

AGENCY: Environmental Protection Agency (EPA).

ACTION: Compilation of recommended water quality criteria and notice of process for new and revised criteria.

SUMMARY: EPA is publishing a compilation of its national recommended water quality criteria for 157 pollutants, developed pursuant to section 304(a) of the Clean Water Act (CWA or the Act). These recommended criteria provide guidance for States and Tribes in adopting water quality standards under section 303(c) of the CWA. Such standards are used in implementing a number of environmental programs, including setting discharge limits in National Pollutant Discharge Elimination System (NPDES) permits. These water quality criteria are not regulations, and do not impose legally binding requirements on EPA, States, Tribes or the public.

This document also describes changes in EPA's process for deriving new and revised 304(a) criteria. Comments provided to the Agency about the content of this Notice will be considered in future publications of water quality criteria and in carrying out the process for deriving water quality criteria. With this improved process the public will have more opportunity to provide data and views for consideration by EPA. The public may send any comments or observations regarding the compilation format or the process for deriving new or revised water quality criteria to the Agency now, or anytime while the process is being implemented.

ADDRESSES: A copy of the document, "National Recommended Water Quality Criteria" is available from the U.S. EPA, National Center for Environmental Publications and Information, 11029 Kenwood Road, Cincinnati, Ohio 45242, phone (513) 489–8190. The publication is also available electronically at: http://www.epa.gov/ost. Send an original and 3 copies of written comments to W–98–24 Comment Clerk, Water Docket, MC 4104, US EPA, 401 M Street, S.W., Washington, D.C. 20460. Comments may also be submitted electronically to OW-Docket@epamail.epa.gov. Comments should be submitted as a WP5.1, 6.1 or an ASCII file with no form of encryption. The documents cited in the compilation of recommended criteria are available for inspection from 9 to 4 p.m., Monday through Friday, excluding legal holidays, at the Water Docket, EB57, East Tower Basement, USEPA, 401 M St., S.W., Washington, D.C. 20460. For access to these materials, please call (202) 260–3027 to schedule an appointment.

FOR FURTHER INFORMATION CONTACT: Cindy A. Roberts, Health and Ecological Criteria Division (4304), U.S. EPA, 401 M. Street, S.W., Washington, D.C. 20460; (202) 260–2787; roberts.cindy@epamail.epa.gov.

SUPPLEMENTARY INFORMATION:

I. What Are Water Quality Criteria?

Section 304(a)(1) of the Clean Water Act requires EPA to develop and publish, and from time to time revise, criteria for water quality accurately reflecting the latest scientific knowledge. Water quality criteria developed under section 304(a) are based solely on data and scientific judgments on the relationship between pollutant concentrations and environmental and human health effects. Section 304(a) criteria do not reflect consideration of economic impacts or the technological feasibility of meeting the chemical concentrations in ambient water. Section 304(a) criteria provide guidance to States and Tribes in adopting water quality standards that ultimately provide a basis for controlling discharges or releases of pollutants. The criteria also provide guidance to EPA when promulgating federal regulations under section 303(c) when such action is necessary.

II. What is in the Compilation Published Today?

EPA is today publishing a compilation of its national recommended water quality criteria for 157 pollutants. This compilation is also available in hard copy at the address given above.

The compilation is presented as a summary table containing EPA's water quality criteria for 147 pollutants, and for an additional 10 pollutants, criteria solely for organoleptic effects. For each set of criteria, EPA lists a **Federal Register** citation, EPA document number or Integrated Risk Information System (IRIS) entry (www.epa.gov/ngispgm3/iris/irisdat). Specific information pertinent to the derivation of individual criteria may be found in cited references. If no criteria are listed for a pollutant, EPA does not have any national recommended water quality criteria.

These water quality criteria are the Agency's current recommended 304(a) criteria, reflecting the latest scientific knowledge. They are generally applicable to the waters of the United States. EPA recommends that States and Tribes use these water quality criteria as guidance in adopting water quality standards pursuant to section 303(c) of the Act and the implementing of federal regulations at 40 CFR part 131. Water quality criteria derived to address site-specific situations are not included; EPA recommends that States and Tribes follow EPA's technical guidance in the "Water Quality Standards Handbook—2nd Edition," EPA, August 1994, in deriving such site-specific criteria. EPA recognizes that in limited circumstances there may be regulatory voids in the absence of State or Tribal water quality standards for specific pollutants. However, States and Tribes should utilize the existing State and Tribal narrative criteria to address such situations; States and Tribes may consult EPA criteria documents and cites in the summary table for additional information.

The national recommended water quality criteria include: previously published criteria that are unchanged; criteria that have been recalculated from earlier criteria; and newly calculated criteria, based on peer-reviewed assessments, methodologies and data, that have not been previously published.

The information used to calculate the water quality criteria is not included in the summary table. Most information has been previously published by the Agency in a variety of sources, and the summary table cites those sources.

When using these 304(a) criteria as guidance in adopting water quality standards, EPA recommends States and Tribes consult the citations referenced in the summary table for additional information regarding the derivation of individual criteria.

The Agency intends to revise the compilation of national recommended water quality criteria from time to time to keep States and Tribes informed as to the most current recommended water quality criteria.

III. How Are National Recommended Water Quality Criteria Used?

Once new or revised 304(a) criteria are published by EPA, the Agency expects States and Tribes to adopt promptly new or revised numeric water quality criteria into their standards consistent with one of the three options in 40 CFR 131.11. These options are: (1) Adopt the recommended section 304(a) criteria; (2) adopt section 304(a) criteria modified to reflect site-specific conditions; or, (3) adopt criteria derived using other scientifically defensible methods. In adopting criteria under option (2) or (3), States and Tribes must adopt water quality criteria sufficient to protect the designated uses of their waters. When establishing a numerical value based on 304(a) criteria, States and Tribes may reflect site specific conditions or use other scientifically defensible methods. However, States and Tribes should not selectively apply data or selectively use endpoints, species, risk levels, or exposure parameters in deriving criteria; this would not accurately characterize risk and would not result in criteria protective of designated uses.

EPA emphasizes that, in the course of carrying out its responsibilities under section 303(c), it reviews State and Tribal water quality standards to assess the need for new or revised water quality criteria. EPA generally believes that five years from the date of EPA's publication of new or revised water quality criteria is a reasonable time by which States and Tribes should take action to adopt new or revised water quality criteria necessary to protect the designated uses of their waters. This period is intended to accommodate those States and Tribes that have begun a triennial review and wish to complete the actions they have underway, deferring initiating adoption of new or revised section 304(a) criteria until the next triennial review.

IV. What is the Status of Existing Criteria While They Are Under Revision?

The question of the status of the existing section 304(a) criteria often arises when EPA announces that it is beginning a reassessment of existing criteria. The general answer is that water quality criteria published by EPA remain the Agency's recommended water quality criteria until EPA revises or withdraws the criteria. For example, while undertaking recent reassessments of dioxin, PCBs, and other chemicals, EPA has consistently upheld the use of the current section 304(a) criteria for these chemicals and considers them to be scientifically sound until new, peer reviewed, scientific assessments indicate changes are needed. Therefore, the criteria in today's notice are and will continue to be the Agency's national recommended water quality criteria for States and Tribes to use in adopting or revising their water quality standards until superseded by the publication of revised criteria, or withdrawn by notice in the **Federal Register**.

V. What is the Process for Developing New or Revised Criteria?

Section 304(a)(1) of the CWA requires the Agency to develop and publish, and from time to time revise, criteria for water quality accurately reflecting the latest scientific knowledge. The Agency has developed an improved process that it intends to use when deriving new criteria or conducting a major reassessment of existing criteria. The purpose of the improved process is to provide expanded opportunities for public input, and to make the process more efficient.

When deriving new criteria, or when initiating a major reassessment of existing criteria, EPA will take the following steps.

1. EPA will first undertake a comprehensive review of available data and information.

2. EPA will publish a notice in the **Federal Register** and on the Internet announcing its assessment or reassessment of the pollutant. The notice will describe the data available to the Agency, and will solicit any additional pertinent data or views that may be useful in deriving new or revised criteria. EPA is especially interested in hearing from the public regarding new data or information that was unavailable to the Agency, and scientific views as to the application of the relevant Agency methodology for deriving water quality criteria.

3. After public input is received and evaluated, EPA will then utilize information obtained from both the Agency's literature review and the public to develop draft recommended water quality criteria.

4. EPA will initiate a peer review of the draft criteria. Agency peer review consists of a documented critical review by qualified independent experts. Information about EPA peer review practices may be found in the Science Policy Council's Peer Review Handbook (EPA 100–B–98–001, www.epa.gov).

5. Concurrent with the peer review in step four, EPA will publish a notice in the **Federal Register** and on the Internet, of the availability of the draft water quality criteria and solicit views from the public on issues of science pertaining to the information used in deriving the draft criteria. The Agency believes it is important to provide the public with the opportunity to provide scientific views on the draft criteria even though we are not required to invite and respond to written comments.

6. EPA will evaluate the results of the peer review, and prepare a response document for the record in accordance with EPA's Peer Review Handbook. EPA at the same time will consider views provided by the public on issues of science. Major scientific issues will be addressed in the record whether from the peer review or the public.

7. EPA will then revise the draft criteria as necessary, and announce the availability of the final water quality criteria in the **Federal Register** and on the Internet.

VI. What is the Process for Minor Revisions to Criteria?

In addition to developing new criteria, and conducting major reassessments of existing criteria, EPA also from time to time recalculates criteria based on new information pertaining to individual components of the criteria. For example, in today's notice, EPA has recalculated a number of criteria based on new, peer-reviewed data contained in EPA's IRIS. Because such recalculations normally result in only minor changes to the criteria, do not ordinarily involve a change in the underlying scientific methodologies, and reflect peer-reviewed data, EPA will typically publish such recalculated criteria directly as the Agency's recommended water quality criteria. If it appears that a recalculation results in a significant change EPA will follow the process of peer review and public input outlined above. Further, when EPA recalculates national water quality criteria in the course of proposing or promulgating state-specific federal water quality standards pursuant to section 303(c), EPA will offer an opportunity for national public input on the recalculated criteria.

VII. How Does the Process Outlined Above Improve Public Input and Efficiency?

In the past, EPA developed draft criteria documents and announced their availability for public comment in the **Federal Register**. This led to new data and views coming to EPA's attention after draft criteria had already been developed. Responding to new data would sometimes lead to extensive revisions.

The steps outlined above improve the criteria development process in the following ways.

1. The new process is Internet-based which is in line with EPA policy for public access and dissemination of information gathered by EPA. Use of the Internet will allow the public to be more engaged in the criteria development process than previously and to more

knowledgeably follow criteria development. For new criteria or major revisions, EPA will announce its intentions to derive the new or revised criteria on the Internet and include a list of the available literature. This will give the public an opportunity to provide additional data that might not otherwise be identified by the Agency.

2. The public now has two opportunities to contribute data and views, before development and during development, instead of a single opportunity after development.

3. EPA has instituted broader and more formal peer review procedures. This independent scientific review is a more rigorous disciplinary practice to ensure technical improvements in Agency decision making. Previously, EPA used the public comment process outlined above to obtain peer review. The new process allows for both public input and a formal peer review, resulting in a more thorough and complete evaluation of the criteria.

4. Announcing the availability of the draft water quality criteria on the Internet will give the public an opportunity to provide input on issues of science in a more timely manner.

VIII. Where Can I Find More Information About Water Quality Criteria and Water Quality Standards?

For more information about water quality criteria and Water Quality Standards refer to the following: Water Quality Standards Handbook (EPA 823–B94–005a); Advanced Notice of Proposed Rule Making (ANPRM), (63 FR 36742); Water Quality Criteria and Standards Plan—Priorities for the Future (EPA 822–R–98–003); Guidelines and Methodologies Used in the Preparation of Health Effects Assessment Chapters of the Consent Decree Water Criteria Documents (45 FR 79347); Draft Water Quality Criteria Methodology Revisions: Human Health (63 FR 43755, EPA 822–Z–98–001); and Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses (EPA 822/R–85–100); National Strategy for the Development of Regional Nutrient Criteria (EPA 822–R–98–002).

These publications may also be accessed through EPA's National Center for Environmental Publications and Information (NCEPI) or on the Office of Science and Technology's Home-page (www.epa.gov/OST).

IX. What Are the National Recommended Water Quality Criteria?

The following compilation and its associated footnotes and notes presents the national recommended water quality criteria.

NATIONAL RECOMMENDED WATER QUALITY CRITERIA FOR PRIORITY TOXIC POLLUTANTS

Priority pollutant	CAS No.	Freshwater		Saltwater		Human health for consumption of:		FR cite/source
		CMC (µg/L)	CCC (µg/L)	CMC (µg/L)	CCC (µg/L)	Water + organism (µg/L)	Organism only (µg/L)	
1 Antimony	7440360	...	...	...	...	14^{B,Z}	4300^{B}	57 FR 60848
2 Arsenic	7440382	340^{A,D,K}	150^{A,D,K}	69^{A,D,bb}	36^{A,D,bb}	...	...	62 FR 42160
						0.018^{C,M,S}	0.14^{C,M,S}	57 FR 60848
3 Beryllium	7440417	...	...	...	...	^{J,Z}	^{J}	62 FR 42160
4 Cadmium	7440439	4.3^{D,E,K}	2.2^{D,E,K}	42^{D,bb}	9.3^{D,bb}	^{J,Z}	^{J}	62 FR 42160
5a Chromium III	16065831	570^{D,E,K}	74^{D,E,K}	...	...	...	...	EPA 820/B–96–001
						^{J,Z} Total	^{J}	62 FR 42160
5b Chromium VI	18540299	16^{D,K}	11^{D,K}	1,100^{D,bb}	50^{D,bb}	^{J,Z} Total	^{J}	62 FR 42160
6 Copper	7440508	13^{D,E,K,cc}	9.0^{D,E,K,cc}	4.8^{D,cc,ff}	3.1^{D,cc,ff}	1,300^{U}	...	62 FR 42160
7 Lead	7439921	65^{D,E,bb,gg}	2.5^{D,E,bb,gg}	210^{D,bb}	8.1^{D,bb}	^{J}	^{J}	62 FR 42160
8 Mercury	7439976	1.4^{D,K,hh}	0.77^{D,K,hh}	1.8^{D,ee,hh}	0.94^{D,ee,hh}	0.050^{B}	0.051^{B}	62 FR 42160
9 Nickel	7440020	470^{D,E,K}	52^{D,E,K}	74^{D,bb}	8.2^{D,bb}	610^{B}	4,600^{B}	62 FR 42160
10 Selenium	7782492	^{L,R,T}	5.0^{T}	290^{D,bb,dd}	71^{D,bb,dd}	...	...	62 FR 42160
						170^{Z}	11,000	IRIS 09/01/91
11 Silver	7440224	3.4^{D,E,G}	...	1.9^{D,G}	...	...	...	62 FR 42160
12 Thallium	7440280	...	...	...	...	1.7^{B}	6.3^{B}	57 FR 60848
13 Zinc	7440666	120^{D,E,K}	120^{D,E,K}	90^{D,bb}	81^{D,bb}	...	...	62 FR 42160
						9,100^{U}	69,000^{U}	IRIS 10/01/92
14 Cyanide	57125	22^{K,Q}	5.2^{K,Q}	...	...	...	...	EPA 820/B–96–001
				1^{Q,bb}	1^{Q,bb}	700^{B,Z}	220,000^{B,H}	57 FR 60848
15 Asbestos	1332214	...	...	...	...	7 million fibers/L^{I}	...	57 FR 60848
16 2, 3, 7, 8-TCDD Dioxin	1746016	...	...	...	...	1.3E–8^{C}	1.4E–8^{C}	62 FR 42160
17 Acrolein	107028	...	...	...	...	320	780	57 FR 60848
18 Acrylonitrile	107131	...	...	...	...	0.059^{B,C}	0.66^{B,C}	57 FR 60848
19 Benzene	71432	...	...	...	...	1.2^{B,C}	71^{B,C}	62 FR 42160
20 Bromoform	75252	...	...	...	...	4.3^{B,C}	360^{B,C}	62 FR 42160
21 Carbon Tetrachloride	56235	...	...	...	...	0.25^{B,C}	4.4^{B,C}	57 FR 60848
22 Chlorobenzene	108907	...	...	...	...	680^{B,Z}	21,000^{B,H}	57 FR 60848
23 Chlorodibromomethane	124481	...	...	...	...	0.41^{B,C}	34^{B,C}	62 FR 42160
24 Chloroethane	75003							
25 2-Chloroethylvinyl Ether	110758							
26 Chloroform	67663	...	...	...	...	5.7^{B,C}	470^{B,C}	62 FR 42160
27 Dichlorobromomethane	75274	...	...	...	...	0.56^{B,C}	46^{B,C}	62 FR 42160
28 1,1-Dichloroethane	75343							
29 1,2-Dichloroethane	107062	...	...	...	...	0.38^{B,C}	99^{B,C}	57 FR 60848
30 1,1-Dichloroethylene	75354	...	...	...	...	0.057^{B,C}	3.2^{B,C}	57 FR 60848
31 1,2-Dichloropropane	78875	...	...	...	...	0.52^{B,C}	39^{B,C}	62 FR 42160
32 1,3-Dichloropropene	542756	...	...	...	...	10^{B}	1,700^{B}	57 FR 60848
33 Ethylbenzene	100414	...	...	...	...	3,100^{B,Z}	29,000^{B}	62 FR 42160
34 Methyl Bromide	74839	...	...	...	...	48^{B}	4000^{B}	62 FR 42160
35 Methyl Chloride	74873	...	...	...	...	^{J}	^{J}	62 FR 42160
36 Methylene Chloride	75092	...	...	...	...	4.7^{B,C}	1600^{B,C}	62 FR 42160
37 1,1,2,2-Tetrachloroethane	79345	...	...	...	...	0.17^{B,C}	11^{B,C}	57 FR 60848
38 Tetrachloroethylene	127184	...	...	...	...	0.8^{C}	8.85^{C}	57 FR 60848
39 Toluene	108883	...	...	...	...	6,800^{B,Z}	200,000^{B}	62 FR 42160
40 1,2-Trans-Dichloroethylene	156605	...	...	...	...	700^{B,Z}	140,000^{B}	62 FR 42160
41 1,1,1-Trichloroethane	71556	...	...	...	...	^{J,Z}	^{J}	62 FR 42160
42 1,1,2-Trichloroethane	79005	...	...	...	...	0.60^{B,C}	42^{B,C}	57 FR 60848
43 Trichloroethylene	79016	...	...	...	...	2.7^{C}	81^{C}	57 FR 60848
44 Vinyl Chloride	75014	...	...	...	...	2.0^{C}	525^{C}	57 FR 60848
45 2-Chlorophenol	95578	...	...	...	...	120^{B,U}	400^{B,U}	62 FR 42160
46 2,4-Dichlorophenol	120832	...	...	...	...	93^{B,U}	790^{B,U}	57 FR 60848
47 2,4-Dimethylphenol	105679	...	...	...	...	540^{B,U}	2,300^{B,U}	62 FR 42160
48 2-Methyl-4,6-Dinitrophenol	534521	...	...	...	...	13.4	765	57 FR 60848
49 2,4-Dinitrophenol	51285	...	...	...	...	70^{B}	14,000^{B}	57 FR 60848
50 2-Nitrophenol	88755							
51 4-Nitrophenol	100027							
52 3-M[illegible]-Chlorophenol	59507	...	...	...	...	^{U}	^{U}	

NATIONAL RECOMMENDED WATER QUALITY CRITERIA FOR PRIORITY TOXIC POLLUTANTS—Continued

	Priority pollutant	CAS No.	Freshwater		Saltwater		Human health for consumption of:		FR cite/source
			CMC (µg/L)	CCC (µg/L)	CMC (µg/L)	CCC (µg/L)	Water + organism (µg/L)	Organism only (µg/L)	
53	Pentachlorophenol	87865	19[P,K]	15[P,K]	13[bb]	7.9[bb]	0.28[B,C]	8.2[B,C,H]	62 FR 42160
54	Phenol	108952					21,000[B,U]		62 FR 42160
								4,600,000[B,H,U]	57 FR 60848
55	2,4,6-Trichlorophenol	88062					2.1[B,C,U]	6.5[B,C]	62 FR 42160
56	Acenaphthene	83329					1,200[B,U]	2,700[B,U]	62 FR 42160
57	Acenaphthylene	208968							
58	Anthracene	120127					9,600[B]	110,000[B]	62 FR 42160
59	Benzidine	92875					0.00012[B,C]	0.00054[B,C]	57 FR 60848
60	BenzoaAnthracene	56553					0.0044[B,C]	0.049[B,C]	62 FR 42160
61	BenzoaPyrene	50328					0.0044[B,C]	0.049[B,C]	62 FR 42160
62	BenzobFluoranthene	205992					0.0044[B,C]	0.049[B,C]	62 FR 42160
63	BenzoghiPerylene	191242							
64	BenzokFluoranthene	207089					0.0044[B,C]	0.049[B,C]	62 FR 42160
65	Bis2-ChloroethoxyMethane	111911							
66	Bis2-ChloroethylEther	111444					0.031[B,C]	1.4[B,C]	57 FR 60848
67	Bis2-ChloroisopropylEther	39638329					1,400[B]		62 FR 42160
								170,000[B]	57 FR 60848
68	Bis2-EthylhexylPhthalate[X]	117817					1.8[B,C]	5.9[B,C]	57 FR 60848
69	4-Bromophenyl Phenyl Ether	101553							
70	Butylbenzyl Phthalate[W]	85687					3,000[B]	5,200[B]	62 FR 42160
71	2-Chloronaphthalene	91587					1,700[B]	4,300[B]	62 FR 42160
72	4-Chlorophenyl Phenyl Ether	7005723							
73	Chrysene	218019					0.0044[B,C]	0.049[B,C]	62 FR 42160
74	Dibenzoa,hAnthracene	53703					0.0044[B,C]	0.049[B,C]	62 FR 42160
75	1,2-Dichlorobenzene	95501					2,700[B,Z]	17,000[B]	62 FR 42160
76	1,3-Dichlorobenzene	541731					400	2,600	62 FR 42160
77	1,4-Dichlorobenzene	106467					400[Z]	2,600	62 FR 42160
78	3,3'-Dichlorobenzidine	91941					0.04[B,C]	0.077[B,C]	57 FR 60848
79	Diethyl Phthalate[W]	84662					23,000[B]	120,000[B]	57 FR 60848
80	Dimethyl Phthalate[W]	131113					313,000	2,900,000	57 FR 60848
81	Di-n-Butyl Phthalate[W]	84742					2,700[B]	12,000[B]	57 FR 60848
82	2,4-Dinitrotoluene	121142					0.11[C]	9.1[C]	57 FR 60848
83	2,6-Dinitrotoluene	606202							
84	Di-n-Octyl Phthalate	117840							
85	1,2-Diphenylhydrazine	122667					0.040[B,C]	0.54[B,C]	57 FR 60848
86	Fluoranthene	206440					300[B]	370[B]	62 FR 42160
87	Fluorene	86737					1,300[B]	14,000[B]	62 FR 42160
88	Hexachlorobenzene	118741					0.00075[B,C]	0.00077[B,C]	62 FR 42160
89	Hexachlorobutadiene	87683					0.44[B,C]	50[B,C]	57 FR 60848
90	Hexachlorocyclopentadiene	77474					240[B,U,Z]	17,000[B,H,U]	57 FR 60848
91	Hexachloroethane	67721					1.9[B,C]	8.9[B,C]	57 FR 60848
92	Ideno 1,2,3-cdPyrene	193395					0.0044[B,C]	0.049[B,C]	62 FR 42160
93	Isophorone	78591					36[B,C]	2,600[B,C]	IRIS 11/01/97
94	Naphthalene	91203							
95	Nitrobenzene	98953					17[B]	1,900[B,H,U]	57 FR 60848
96	N-Nitrosodimethylamine	62759					0.00069[B,C]	8.1[B,C]	57 FR 60848
97	N-Nitrosodi-n-Propylamine	621647					0.005[B,C]	1.4[B,C]	62 FR 42160
98	N-Nitrosodiphenylamine	86306					5.0[B,C]	16[B,C]	57 FR 60848
99	Phenanthrene	85018							
100	Pyrene	129000					960[B]	11,000[B]	62 FR 42160
101	1,2,4-Trichlorobenzene	120821					260[Z]	940	IRIS 11/01/96
102	Aldrin	309002	3.0[G]		1.3[G]		0.00013[B,C]	0.00014[B,C]	62 FR 42160
103	alpha-BHC	319846					0.0039[B,C]	0.013[B,C]	62 FR 42160
104	beta-BHC	319857					0.014[B,C]	0.046[B,C]	62 FR 42160
105	gamma-BHC (Lindane)	58899	0.95[K]		0.16[G]		0.019[C]	0.063[C]	62 FR 42160
106	delta-BHC	319868							
107	Chlordane	57749	2.4[G]	0.0043[G,aa]	0.09[G]	0.004[G,aa]			62 FR 42160
							0.0021[B,C]	0.0022[B,C]	IRIS 02/07/98

108	4,4′-DDT	50293	1.1 [G]	0.001 [G,aa]	0.13 [G]	0.001 [G,aa]	0.00059 [B,C]	0.00059 [B,C]	62 FR 42160
109	4,4′-DDE	72559					0.00059 [B,C]	0.00059 [B,C]	62 FR 42160
110	4,4′-DDD	72548					0.00083 [B,C]	0.00084 [B,C]	62 FR 42160
111	Dieldrin	60571	0.24 [K]	0.056 [K,O]	0.71 [G]	0.0019 [G,aa]	0.00014 [B,C]	0.00014 [B,C]	62 FR 42160
112	alpha-Endosulfan	959988	0.22 [G,Y]	0.056 [G,Y]	0.034 [G,Y]	0.0087 [G,Y]	110 [B]	240 [B]	62 FR 42160
113	beta-Endosulfan	33213659	0.22 [G,Y]	0.056 [G,Y]	0.034 [G,Y]	0.0087 [G,Y]	110 [B]	240 [B]	62 FR 42160
114	Endosulfan Sulfate	1031078					110 [B]	240 [B]	62 FR 42160
115	Endrin	72208	0.086 [K]	0.036 [K,O]	0.037 [G]	0.0023 [G,aa]	0.76 [B]	0.81 [B,H]	62 FR 42160
116	Endrin Aldehyde	7421934					0.76 [B]	0.81 [B,H]	62 FR 42160
117	Heptachlor	76448	0.52 [G]	0.0038 [G,aa]	0.053 [G]	0.0036 [G,aa]	0.00021 [B,C]	0.00021 [B,C]	62 FR 42160
118	Heptachlor Epoxide	1024573	0.52 [G,V]	0.0038 [G,V,aa]	0.053 [G,V]	0.0036 [G,V,aa]	0.00010 [B,C]	0.00011 [B,C]	62 FR 42160
119	Polychlorinated Biphenyls			0.014 [N,aa]		0.03 [N,aa]			62 FR 42160
	PCBs						0.00017 [B,C,P]	0.00017 [B,C,P]	63 FR 16182
120	Toxaphene	8001352	0.73	0.0002 [aa]	0.21	0.0002 [aa]	0.00073 [B,C]	0.00075 [B,C]	62 FR 42160

Footnotes:

[A] This recommended water quality criterion was derived from data for arsenic (III), but is applied here to total arsenic, which might imply that arsenic (III) and arsenic (V) are equally toxic to aquatic life and that their toxicities are additive. In the arsenic criteria document (EPA 440/5–84–033, January 1985), Species Mean Acute Values are given for both arsenic (III) and arsenic (V) for five species and the ratios of the SMAVs for each species range from 0.6 to 1.7. Chronic values are available for both arsenic (III) and arsenic (V) for one species; for the fathead minnow, the chronic value for arsenic (V) is 0.29 times the chronic value for arsenic (III). No data are known to be available concerning whether the toxicities of the forms of arsenic to aquatic organisms are additive.

[B] This criterion has been revised to reflect The Environmental Protection Agency's q1* or RfD, as contained in the Integrated Risk Information System (IRIS) as of April 8, 1998. The fish tissue bioconcentration factor (BCF) from the 1980 Ambient Water Quality Criteria document was retained in each case.

[C] This criterion is based on carcinogenicity of 10^{-6} risk. Alternate risk levels may be obtained by moving the decimal point (e.g., for a risk level of 10^{-5}, move the decimal point in the recommended criterion one place to the right).

[D] Freshwater and saltwater criteria for metals are expressed in terms of the dissolved metal in the water column. The recommended water quality criteria value was calculated by using the previous 304(a) aquatic life criteria expressed in terms of total recoverable metal, and multiplying it by a conversion factor (CF). The term "Conversion Factor" (CF) represents the recommended conversion factor for converting a metal criterion expressed as the total recoverable fraction in the water column to a criterion expressed as the dissolved fraction in the water column. (Conversion Factors for saltwater CCCs are not currently available. Conversion factors derived for saltwater CMCs have been used for both saltwater CMCs and CCCs.) See "Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria," October 1, 1993, by Martha G. Prothro, Acting Assistant Administrator for Water, available from the Water Resource center, USEPA, 401 M St., SW, mail code RC4100, Washington, DC 20460; and 40 CFR § 131.36(b)(1). Conversion Factors applied in the table can be found in Appendix A to the Preamble—Conversion Factors for Dissolved Metals.

[E] The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. The value given here corresponds to a hardness of 100 mg/L. Criteria values for other hardness may be calculated from the following: CMC (dissolved) = exp $\{m_A\ [\ln(\text{hardness})]+b_A\}$ (CF), or CCC (dissolved) = exp $\{m_C\ [\ln(\text{hardness})]+b_C\}$ (CF) and the parameters specified in Appendix B to the Preamble—Parameters for Calculating Freshwater Dissolved Metals Criteria That Are Hardness-Dependent.

[F] Freshwater aquatic life values for pentachlorophenol are expressed as a function of pH, and are calculated as follows: CMD=exp(1.005(pH) − 4.869); CCC=exp(1.005 (pH) − 5.134). Values displayed in table correspond to a pH of 7.8.

[G] This Criterion is based on 304(a) aquatic life criterion issued in 1980, and was issued in one of the following documents: Aldrin/Dieldrin (EPA 440/5–80–019), Chlordane (EPA 440/5–80–027), DDT (EPA 440/5–80–038), Endosulfan (EPA 440/5–80–046), Endrin (EPA 440/5–80–047), Heptachlor (440/5–80–052), Hexachlorocyclohexane (EPA 440/5–80–054), Silver (EPA 440/5–80–071). The Minimum Data Requirements and derivation procedures were different in the 1980 Guidelines than in the 1985 Guidelines. For example, a "CMC" derived using the 1980 Guidelines was derived to be used as an instantaneous maximum. If assessment is to be done using an averaging period, the values given should be divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.

[H] No criterion for protection of human health from consumption of aquatic organisms excluding water was presented in the 1980 criteria document or in the 1986 Quality Criteria for Water. Nevertheless, sufficient information was presented in the 1980 document to allow the calculation of a criterion, even though the results of such a calculation were not shown in the document.

[I] This criterion for asbestos is the Maximum Contaminant Level (MCL) developed under the Safe Drinking Water Act (SDWA).

[J] EPA has not calculated human health criterion for this contaminant. However, permit authorities should address this contaminant in NPDES permit actions using the State's existing narrative criteria for toxics.

[K] This recommended criterion is based on a 304(a) aquatic life criterion that was issued in the 1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water, (EPA–820–B–96–011, September 1996). This value was derived using the GLI Guidelines (60 FR 15393–15399, March 23, 1995; 40 CFR 132 Appendix A); the difference between the 1985 Guidelines and the GLI Guidelines are explained on page iv of the 1995 Updates. None of the decisions concerning the derivation of this criterion were affected by any considerations that are specific to the Great Lakes.

[L] The CMC=1/[(f1/CMC1)=(f2/CMC2)] where f1 and f2 are the fractions of total selenium that are treated as selenite and selenate, respectively, and CMC1 and CMC2 are 185.9 µg/l and 12.83 µg/l, respectively.

[M] EPA is currently reassessing the criteria for arsenic. Upon completion of the reassessment the Agency will publish revised criteria as appropriate.

[N] PCBs are a class of chemicals which include aroclors, 1242, 1254, 1221, 1232, 1248, 1260, and 1016, CAS numbers 53469219, 11097691, 11104282, 11141165, 12672296, 11096825 and 12674112 respectively. The aquatic life criteria apply to this set of PCBs.

[O] The derivation of the CCC for this pollutant did not consider exposure through the diet, which is probably important for aquatic life occupying upper trophic levels.

[P] This criterion applies to total pcbs, i.e., the sum of all congener or all isomer analyses.

[Q] This recommended water quality criterion is expressed as µg free cyanide (as CN)/L.

[R] This value was announced (61 FR 58444–58449, November 14, 1996) as a proposed GLI 303(c) aquatic life criterion. EPA is currently working on this criterion and so this value might change substantially in the near future.

[S] This recommended water quality criterion refers to the inorganic form only.

[T] This recommended water quality criterion is expressed in terms of total recoverable metal in the water column. It is scientifically acceptable to use the conversion factor of 0.922 that was used in the GLI to convert this to a value that is expressed in terms of dissolved metal.

[U] The or leptic effect criterion is more stringent than the value for priority toxic pollutants.

[v] This value was derived from data for heptachlor and the criteria document provides insufficient data to estimate the relative toxicities of heptachlor and heptachlor epoxide.

[w] Although EPA has not published a final criteria document for this compound it is EPA's understanding that sufficient data exist to allow calculation of aquatic criteria. It is anticipated that industry intends to publish in the peer reviewed literature draft aquatic life criteria generated in accordance with EPA Guidelines. EPA will review such criteria for possible issuance as national WQC.

[x] There is a full set of aquatic life toxicity data that show that DEHP is not toxic to aquatic organisms at or below its solubility limit.

[y] This value was derived from data for endosulfan and is most appropriately applied to the sum of alpha-endosulfan and beta-endosulfan.

[z] A more stringent MCL has been issued by EPA. Refer to drinking water regulations (40 CFR 141) or Safe Drinking Water Hotline (1–800–426–4791) for values.

[aa] This CCC is based on the Final Residue Value procedure in the 1985 Guidelines. Since the publication of the Great Lakes Aquatic Life Criteria Guidelines in 1995 (60FR 15393–15399, March 23, 1995), the Agency no longer uses the Final Residue Value procedure for deriving CCCs for new or revised 304(a) aquatic life criteria.

[bb] This water quality criterion is based on 304(a) aquatic life criterion that was derived using the 1985 Guidelines (Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses, PB85–227049, January 1985) and was issued in one of the following criteria documents: Arsenic (EPA 440/5–84–033), Cadmium (EPA 440/5–84–032), Chromium (EPA 440/5–84–029), Copper (EPA 440/5–84–031), Cyanide (EPA 400/5–84–028), Lead (EPA 440/5–84–027), Nickel (EPA 440/5–86–004), Pentachlorophenol (EPA 440/5–86–009), Toxaphene (EPA 440/5–86–006), Zinc (EPA 440/5–87–003).

[cc] When the concentration of dissolved organic carbon is elevated, copper is substantially less toxic and use of Water-Effect Ratios might be appropriate.

[dd] The selenium criteria document (EPA 440/5–87–006, September 1987) provides that if selenium is as toxic to saltwater fishes in the field as it is to freshwater fishes in the field, the status of the fish community should be monitored whenever the concentration of selenium exceeds 5.0 µg/L in salt water because the saltwater CCC does not take into account uptake via the food chain.

[ee] This recommended water quality criterion was derived on page 43 of the mercury criteria document (EPA 440/5–84–026, January 1985). The saltwater CCC of 0.025 µg/L given on page 23 of the criteria document is based on the Final Residue Value procedure in the 1985 Guidelines. Since the publication of the Great Lakes Aquatic Life Criteria Guidelines in 1995 (60FR15393–15399, March 23, 1995), the Agency no longer uses the Final Residue Value procedure for deriving CCCs for new or revised 304(a) aquatic life criteria.

[ff] This recommended water quality criterion was derived in Ambient Water Quality Criteria Saltwater Copper Addendum (Draft, April 14, 1995) and was promulgated in the Interim Final National Toxics Rule (60FR22228–222237, May 4, 1995).

[gg] EPA is actively working on this criterion and so this recommended water quality criterion may change substantially in the near future.

[hh] This recommended water quality criterion was derived from data for inorganic mercury (II), but is applied here to total mercury. If a substantial portion of the mercury in the water column is methylmercury, this criterion will probably be under protective. In addition, even though inorganic mercury is converted to methylmercury and methylmercury bioaccumulates to a great extent, this criterion does not account for uptake via the food chain because sufficient data were not available when the criteria was derived.

NATIONAL RECOMMENDED WATER QUALITY CRITERIA FOR NON PRIORITY POLLUTANTS

	Non priority pollutant	CAS No.	Freshwater		Saltwater		Human health for consumption of:		FR cite/source
			CMC (µg/L)	CCC (µg/L)	CMC (µg/L)	CCC (µg/L)	Water + organism (µg/L)	Organism only (µg/L)	
1	Alkalinity			20000 [F]					Gold Book
2	Aluminum pH 6.5–9.0	7429905	750 [G,I]	87 [G,I,L]					53 FR 33178
3	Ammonia	7664417	FRESHWATER CRITERIA ARE pH DEPENDENT—SEE DOCUMENT						EPA822–R–98–008
			SALTWATER CRITERIA ARE pH AND TEMPERATURE DEPENDENT [D]						EPA440/5–88–004
4	Aesthetic Qualities		NARRATIVE STATEMENT—SEE DOCUMENT						Gold Book
5	Bacteria		FOR PRIMARY RECREATION AND SHELLFISH USES—SEE DOCUMENT						Gold Book
6	Barium	7440393					1,000 [A]		Gold Book
7	Boron		NARRATIVE STATEMENT—SEE DOCUMENT						Gold Book
8	Chloride	16887006	860000 [G]	230000 [G]					53 FR 19028
9	Chlorine	7782505	19	11	13	7.5	[C]		Gold Book
10	Chlorophenoxy Herbicide 2,4,5,-TP	93721					10 [A]		Gold Book
11	Chlorophenoxy Herbicide 2,4-D	94757					100 [A,C]		Gold Book
12	Chloropyrifos	2921882	0.083 [G]	0.041 [G]	0.011 [G]	0.0056 [G]			Gold Book
13	Color		NARRATIVE STATEMENT—SEE DOCUMENT [F]						Gold Book
14	Demeton	8065483		0.1 [F,H]		0.1 [F,H]			Gold Book
15	Ether, Bis Chloromethyl	542881					0.00013 [E]	0.00078 [E]	IRIS 01/01/91
16	Gases, Total Dissolved		NARRATIVE STATEMENT—SEE DOCUMENT [F]						Gold Book
17	Guthion	86500		0.01 [F,H]		0.01 [F,H]			Gold Book
18	Hardness		NARRATIVE STATEMENT—SEE DOCUMENT						Gold Book
19	Hexachlorocyclo-hexane-Technical	319868					0.0123	0.0414	Gold Book
20	Iron	7439896		1000 [F]			300 [A]		Gold Book
21	Malathion	121755		0.1 [F,H]					Gold Book
22	Manganese	7439965					50 [A]	100 [A]	Gold Book
23	Methoxychlor	72435		0.03 [F,H]		0.03 [F,H]	100 [A,C]		Gold Book
24	Mirex	2385855		0.001 [F,H]		0.001 [F,H]			Gold Book
25	Nitrates	14797558					10,000 [A]		Gold Book
26	Nitrosamines						0.0008	1.24	

27	Dinitrophenols	25550587					70	14,000	Gold Book
28	Nitrosodibutylamine,N	924163					0.0064 [A]	0.587 [A]	Gold Book
29	Nitrosodiethylamine,N	55185					0.0008 [A]	1.24 [A]	Gold Book
30	Nitrosopyrrolidine,N	930552					0.016	91.9	Gold Book
31	Oil and Grease		NARRATIVE STATEMENT—SEE DOCUMENT [F]						Gold Book
32	Oxygen, Dissolved	7782447	WARMWATER AND COLDWATER MATRIX—SEE DOCUMENT [O]						Gold Book
33	Parathion	56382	0.065 [J]	0.013 [J]					Gold Book
34	Pentachlorobenzene	608935					3.5 [E]	4.1 [E]	IRIS 03/01/88
35	pH			6.5–9 [F]		6.5–8.5 [F,K]	5–9		Gold Book
36	Phosphorus Elemental	7723140				0.1 [F,K]			Gold Book
37	Phosphate Phosphorus		NARRATIVE STATEMENT—SEE DOCUMENT						Gold Book
38	Solids Dissolved and Salinity						250,000 [A]		Gold Book
39	Solids Suspended and Turbidity		NARRATIVE STATEMENT—SEE DOCUMENT [F]						Gold Book
40	Sulfide-Hydrogen Sulfide	7783064		2.0 [F,H]		2.0 [F,H]			Gold Book
41	Tainting Substances		NARRATIVE STATEMENT—SEE DOCUMENT						Gold Book
42	Temperature		SPECIES DEPENDENT CRITERIA—SEE DOCUMENT [M]						Gold Book
43	Tetrachlorobenzene,1,2,4,5-	95943					2.3 [E]	2.9 [E]	IRIS03/01/91
44	Tributyltin TBT		0.46 [N]	0.063 [N]	0.37 [N]	0.010 [N]			62 FR 42554
45	Trichlorophenol,2,4,5-	95954					2,600 [B,E]	9,800 [B,E]	IRIS 03/01/88

Footnotes:

[A] This human health criterion is the same as originally published in the Red Book which predates the 1980 methodology and did not utilize the fish ingestion BCF approach. This same criterion value is now published in the Gold Book

[B] The organoleptic effect criterion is more stringent than the value presented in the non priority pollutants table.

[C] A more stringent Maximum Contaminant Level (MCL) has been issued by EPA under the Safe Drinking Water Act. Refer to drinking water regulations 40 CFR 141 or Safe Drinking Water Hotline (1–800–426–4791) for values.

[D] According to the procedures described in the Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses, except possibly where a very sensitive species is important at a site, freshwater aquatic life should be protected if both conditions specified in Appendix C to the Preamble—Calculation of Freshwater Ammonia Criterion are satisfied.

[E] This criterion has been revised to reflect The Environmental Protection Agency's q1* or RfD, as contained in the Integrated Risk Information System (IRIS) as of April 8, 1998. The fish tissue bioconcentration factor (BCF) used to derive the original criterion was retained in each case.

[F] The derivation of this value is presented in the Red Book (EPA 440/9–76–023, July, 1976).

[G] This value is based on a 304(a) aquatic life criterion that was derived using the 1985 Guidelines (Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses, PB85–227049, January 1985) and was issued in one of the following criteria documents: Aluminum (EPA 440/5–86–008); Chloride (EPA 440/5–88–001); Chloropyrifos (EPA 440/5–86–005).

[H] This CCC is based on the Final Residue Value procedure in the 1985 Guidelines. Since the publication of the Great Lakes Aquatic Life Criteria Guidelines in 1995 (60 FR 15393–15399, March 23, 1995), the Agency no longer uses the Final Residue Value procedure for deriving CCCs for new or revised 304(a) aquatic life criteria.

[I] This value is expressed in terms of total recoverable metal in the water column.

[J] This value is based on a 304(a) aquatic life criterion that was issued in the 1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water (EPA–820–B–96–001). This value was derived using the GLI Guidelines (60 FR 15393–15399, March 23, 1995; 40 CFR 132 Appendix A); the differences between the 1985 Guidelines and the GLI Guidelines are explained on page iv of the 1995 Updates. No decision concerning this criterion was affected by any considerations that are specific to the Great Lakes.

[K] According to page 181 of the Red Book: For open ocean waters where the depth is substantially greater than the euphotic zone, the pH should not be changed more than 0.2 units from the naturally occurring variation or any case outside the range of 6.5 to 8.5. For shallow, highly productive coastal and estuarine areas where naturally occurring pH variations approach the lethal limits of some species, changes in pH should be avoided but in any case should not exceed the limits established for fresh water, i.e., 6.5–9.0.

[L] There are three major reasons why the use of Water-Effect Ratios might be appropriate. (1) The value of 87 µg/l is based on a toxicity test with the striped bass in water with pH=6.5–6.6 and hardness <10 mg/L. Data in "Aluminum Water-Effect Ratio for the 3M Plant Effluent Discharge, Middleway, West Virginia" (May 1994) indicate that aluminum is substantially less toxic at higher pH and hardness, but the effects of pH and hardness are not well quantified at this time. (2) In tests with the brook trout at low pH and hardness, effects increased with increasing concentrations of total aluminum even though the concentration of dissolved aluminum was constant, indicating that total recoverable is a more appropriate measurement than dissolved, at least when particulate aluminum is primarily aluminum hydroxide particles. In surface waters, however, the total recoverable procedure might measure aluminum associated with clay particles, which might be less toxic than aluminum associated with aluminum hydroxide. (3) EPA is aware of field data indicating that many high quality waters in the U.S. contain more than 87 µg aluminum/L, when either total recoverable or dissolved is measured.

[M] U.S. EPA. 1973. Water Quality Criteria 1972. EPA–R3–73–033. National Technical Information Service, Springfield, VA.; U.S. EPA. 1977. Temperature Criteria for Freshwater Fish: Protocol and Procedures. EPA–600/3–77–061. National Technical Information Service, Springfield, VA.

[N] This value was announced (62 FR 42554, August 7, 1997) as a proposed 304(a) aquatic life criterion. Although EPA has not responded to public comment, EPA is publishing this as a 304(a) criterion in today's notice as guidance for States and Tribes to consider when adopting water quality criteria.

[O] U.S. EPA. 1986. Ambient Water Quality Criteria for Dissolved Oxygen. EPA 440/5–86–003. National Technical Information Service, Springfield, VA.

NATIONAL RECOMMENDED WATER QUALITY CRITERIA FOR ORGANOLEPTIC EFFECTS

Pollutant	CAS No.	Organoleptic effect criteria (µg/L)	FR cite/source
1 Acenaphthene	208968	20	Gold Book
2 Monochlorobenzene	108907	20	Gold Book
3 3-Chlorophenol		0.1	Gold Book
4 4-Chlorophenol	106489	0.1	Gold Book
5 2,3-Dichlorophenol		0.04	Gold Book
6 2,5-Dichlorophenol		0.5	Gold Book
7 2,6-Dichlorophenol		0.2	Gold Book
8 3,4-Dichlorophenol		0.3	Gold Book
9 2,4,5-Trichlorophenol	95954	1	Gold Book
10 2,4,6-Trichlorophenol	88062	2	Gold Book
11 2,3,4,6-Tetrachlorophenol		1	Gold Book
12 2-Methyl-4-Chlorophenol		1800	Gold Book
13 3-Methyl-4-Chlorophenol	59507	3000	Gold Book
14 3-Methyl-6-Chlorophenol		20	Gold Book
15 2-Chlorophenol	95578	0.1	Gold Book
16 Copper	744058	1000	Gold Book
17 2,4-Dichlorophenol	120832	0.3	Gold Book
18 2,4-Dimethylphenol	105679	400	Gold Book
19 Hexachlorocyclopentadiene	77474	1	Gold Book
20 Nitrobenzene	98953	30	Gold Book
21 Pentachlorophenol	87865	30	Gold Book
22 Phenol	108952	300	Gold Book
23 Zinc	7440666	5000	45 FR 79341

General Notes:

1. These criteria are based on organoleptic (taste and odor) effects. Because of variations in chemical nomenclature systems, this listing of pollutants does not duplicate the listing in Appendix A of 40 CFR Part 423. Also listed are the Chemical Abstracts Service (CAS) registry numbers, which provide a unique identification for each chemical.

National Recommended Water Quality Criteria

Additional Notes

1. Criteria Maximum Concentration and Criterion Continuous Concentration

The Criteria Maximum Concentration (CMC) is an estimate of the highest concentration of a material in surface water to which an aquatic community can be exposed briefly without resulting in an unacceptable effect. The Criterion Continuous Concentration (CCC) is an estimate of the highest concentration of a material in surface water to which an aquatic community can be exposed indefinitely without resulting in an unacceptable effect. The CMC and CCC are just two of the six parts of a aquatic life criterion; the other four parts are the acute averaging period, chronic averaging period, acute frequency of allowed exceedence, and chronic frequency of allowed exceedence. Because 304(a) aquatic life criteria are national guidance, they are intended to be protective of the vast majority of the aquatic communities in the United States.

2. Criteria Recommendations for Priority Pollutants, Non Priority Pollutants and Organoleptic Effects

This compilation lists all priority toxic pollutants and some non priority toxic pollutants, and both human health effect and organoleptic effect criteria issued pursuant to CWA §304(a). Blank spaces indicate that EPA has no CWA §304(a) criteria recommendations. For a number of non-priority toxic pollutants not listed, CWA §304(a) "water + organism" human health criteria are not available, but, EPA has published MCLs under the SDWA that may be used in establishing water quality standards to protect water supply designated uses. Because of variations in chemical nomenclature systems, this listing of toxic pollutants does not duplicate the listing in Appendix A of 40 CFR Part 423. Also listed are the Chemical Abstracts Service CAS registry numbers, which provide a unique identification for each chemical.

3. Human Health Risk

The human health criteria for the priority and non priority pollutants are based on carcinogenicity of 10^{-6} risk. Alternate risk levels may be obtained by moving the decimal point (e.g., for a risk level of 10–5, move the decimal point in the recommended criterion one place to the right).

4. Water Quality Criteria Published Pursuant to Section 304(a) or Section 303(c) of the CWA

Many of the values in the compilation were published in the proposed California Toxics Rule (CTR, 62 FR 42160). Although such values were published pursuant to Section 303(c) of the CWA, they represent the Agency's most recent calculation of water quality criteria and thus are published today as the Agency's 304(a) criteria. Water quality criteria published in the proposed CTR may be revised when EPA takes final action on the CTR.

5. Calculation of Dissolved Metals Criteria

The 304(a) criteria for metals, shown as dissolved metals, are calculated in one of two ways. For freshwater metals criteria that are hardness-dependent, the dissolved metal criteria were calculated using a hardness of 100 mg/l as $CaCO_3$ for illustrative purposes only. Saltwater and freshwater metals' criteria that are not hardness-dependent are calculated by multiplying the total recoverable criteria before rounding by the appropriate conversion factors. The final dissolved metals' criteria in the table are rounded to two significant figures. Information regarding the calculation of hardness dependent conversion factors are included in the footnotes.

6. Correction of Chemical Abstract Services Number

The Chemical Abstract Services number (CAS) for Bis(2-Chloroisopropyl) Ether, has been corrected in the table. The correct CAS number for this chemical is 39638-32-9. Previous publications listed 108-60-1 as the CAS number for this chemical.

7. Maximum Contaminant Levels

The compilation includes footnotes for pollutants with Maximum Contaminant Levels (MCLs) more stringent than the recommended water quality criteria in the compilation. MCLs for these pollutants are not included in the compilation, but can be found in the appropriate drinking water regulations (40 CFR 141.11–16 and 141.60–63), or can be accessed through the Safe Drinking Water Hotline (800–426–4791) or the Internet (http://www.epa.gov/ost/tools/dwstds-s.html).

8. Organoleptic Effects

The compilation contains 304(a) criteria for pollutants with toxicity-based criteria as well as non-toxicity based criteria. The basis for the non-toxicity based criteria are organoleptic effects (e.g., taste and odor) which would make water and edible aquatic life unpalatable but not toxic to humans. The table includes criteria for organoleptic effects for 23 pollutants. Pollutants with organoleptic effect criteria more stringent than the criteria based on toxicity (e.g., included in both the priority and non-priority pollutant tables) are footnoted as such.

9. Category Criteria

In the 1980 criteria documents, certain recommended water quality criteria were published for categories of pollutants rather than for individual pollutants within that category. Subsequently, in a series of separate actions, the Agency derived criteria for specific pollutants within a category. Therefore, in this compilation EPA is replacing criteria representing categories with individual pollutant criteria (e.g., 1,3-dichlorobenzene, 1,4-dichlorobenzene and 1,2-dichlorobenzene).

10. Specific Chemical Calculations

A. Selenium

(1) Human Health

In the 1980 Selenium document, a criterion for the protection of human health from consumption of water and organisms was calculated based on a BCF of 6.0 L/kg and a maximum water-related contribution of 35 µg Se/day. Subsequently, the EPA Office of Health and Environmental Assessment issued an errata notice (February 23, 1982), revising the BCF for selenium to 4.8 L/kg. In 1988, EPA issued an addendum (ECAO–CIN–668) revising the human health criteria for selenium. Later in the final National Toxic Rule (NTR, 57 FR 60848), EPA withdrew previously published selenium human health criteria, pending Agency review of new epidemiological data.

This compilation includes human health criteria for selenium, calculated using a BCF of 4.8 L/kg along with the current IRIS RfD of 0.005 mg/kg/day. EPA included these recommended water quality criteria in the compilation because the data necessary for calculating a criteria in accordance with EPA's 1980 human health methodology are available.

(2) Aquatic Life

This compilation contains aquatic life criteria for selenium that are the same as those published in the proposed CTR. In the CTR, EPA proposed an acute criterion for selenium based on the criterion proposed for selenium in the Water Quality Guidance for the Great Lakes System (61 FR 58444). The GLI and CTR proposals take into account data showing that selenium's two most prevalent oxidation states, selenite and selenate, present differing potentials for aquatic toxicity, as well as new data indicating that various forms of selenium are additive. The new approach produces a different selenium acute criterion concentration, or CMC, depending upon the relative proportions of selenite, selenate, and other forms of selenium that are present.

EPA notes it is currently undertaking a reassessment of selenium, and expects the 304(a) criteria for selenium will be revised based on the final reassessment (63 FR 26186). However, until such time as revised water quality criteria for selenium are published by the Agency, the recommended water quality criteria in this compilation are EPA's current 304(a) criteria.

B. 1,2,4-Trichlorobenzene and Zinc

Human health criteria for 1,2,4-trichlorobenzene and zinc have not been previously published. Sufficient information is now available for calculating water quality criteria for the protection of human health from the consumption of aquatic organisms and the consumption of aquatic organisms and water for both these compounds. Therefore, EPA is publishing criteria for these pollutants in this compilation.

C. Chromium (III)

The recommended aquatic life water quality criteria for chromium (III) included in the compilation are based on the values presented in the document titled: 1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water, however, this document contains criteria based on the total recoverable fraction. The chromium (III) criteria in this compilation were calculated by applying the conversion factors used in the Final Water Quality Guidance for the Great Lakes System (60 FR 15366) to the 1995 Update document values.

D. Ether, Bis (Chloromethyl), Pentachlorobenzene, Tetrachlorobenzene 1,2,4,5- Trichlorophenol

Human health criteria for these pollutants were last published in EPA's Quality Criteria for Water 1986 or "Gold Book". Some of these criteria were calculated using Acceptable Daily Intake (ADIs) rather than RfDs. Updated q1*s and RfDs are now available in IRIS for ether, bis (chloromethyl), pentachlorobenzene, tetrachlorobenzene 1,2,4,5-, and trichlorophenol, and were used to revise the water quality criteria for these compounds. The recommended water quality criteria for ether, bis (chloromethyl) were revised using an updated q1*, while criteria for pentachlorobenzene, and tetrachlorobenzene 1,2,4,5-, and trichlorophenol were derived using an updated RfD value.

E. PCBs

In this compilation EPA is publishing aquatic life and human health criteria based on total PCBs rather than individual arochlors. These criteria replace the previous criteria for the seven individual arochlors. Thus, there are criteria for a total of 102 of the 12? priority pollutants.

Dated: October 26, 1998.

J. Charles Fox,

Assistant Administrator, Office of Water.

Appendix A—Conversion Factors for Dissolved Metals

Metal	Conversion factor freshwater CMC	Conversion factor freshwater CCC	Conversion factor saltwater CMC	Conversion factor saltwater CCC
Arsenic	1.000	1.000	1.000	1.000
Cadmium	1.138672-[(ln hardness) (0.041838)]	1.101672-[(ln hardness) (0.041838)]	0.994	0.994
Chromium III	0.316	0.860		
Chromium VI	0.982	0.962	0.993	0.993
Copper	0.960	0.960	0.83	0.83
Lead	1.46203-[(ln hardness) (0.145712)]	1.46203-[(ln hardness) (0.145712)]	0.951	0.951
Mercury	0.85	0.85	0.85	0.85
Nickel	0.998	0.997	0.990	0.990
Selenium			0.998	0.998
Silver	0.85		0.85	
Zinc	0.978	0.986	0.946	0.946

Appendix B—Parameters for Calculating Freshwater Dissolved Metals Criteria That Are Hardness-Dependent

Chemical	m_A	b_A	m_C	b_C	Freshwater conversion factors (CF)	
					Acute	Chronic
Cadmium	1.128	−3.6867	0.7852	−2.715	1.136672-[ln (hardness)(0.041838)]	1.101672-[ln (hardness)(0.041838)]
Chromium III	0.8190	3.7256	0.8190	0.6848	0.316	0.860
Copper	0.9422	−1.700	0.8545	−1.702	0.960	0.960
Lead	1.273	−1.460	1.273	−4.705	1.46203-[ln (hardness)(0.145712)]	1.46203-[ln (hardness)(0.145712)]
Nickel	0.8460	2.255	0.8460	0.0584	0.998	0.997
Silver	1.72	−6.52			0.85	
Zinc	0.8473	0.884	0.8473	0.884	0.978	0.986

Appendix C—Calculation of Freshwater Ammonia Criterion

1. The one-hour average concentration of total ammonia nitrogen (in mg N/L) does not exceed, more than once every three years on the average, the CMC calculated using the following equation:

$$CMC = \frac{0.275}{1+10^{7.204-pH}} + \frac{39.0}{1+10^{pH-7.204}}$$

In situations where salmonids do not occur, the CMC may be calculated using the following equation:

$$CMC = \frac{0.411}{1+10^{7.204-pH}} + \frac{58.4}{1+10^{pH-7.204}}$$

2. The thirty-day average concentration of total ammonia nitrogen (in mg N/L) does not exceed, more than once every three years on the average, the CCC calculated using the following equation:

$$CCC = \frac{0.0858}{1+10^{7.688-pH}} + \frac{3.70}{1+10^{pH-7.688}}$$

Editorial Note: FR Doc. 98-30272 was originally published as Part IV (63 FR 67548-67558) in the issue of Monday, December 7, 1998. At the request of the agency, due to incorrect footnote identifiers in the tables, the corrected document is being republished in its entirety.

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APPENDIX B

SUMMARY STATISTICS

APPENDIX B
SUMMARY STATISTICS

This appendix provides the summary statistics calculated for each area/medium evaluated in the HHRA. Summary statistics are provided in the following order:

Waste Area - Surface Soil:
N
L
I
H
G

Transect - Surface Soil:
7
6
5
4
3
2
1

Background Subsurface Soil

Background Surface Soil

Surface Water

Sediment

Transect Subsurface Soil:
7
6
5
4
3
2
1

Two tables are provided for each area. The first table presents the summary statistics by constituent, including frequency of detection; Shapiro-Wilk's Test for Normality; Minimum, Maximum and Mean Concentrations; 95% Upper Confidence Limit; and the Selected Site Concentration. These statistics are discussed in Section 3 of the text. The second table presents the sample identification for each sample included in the calculation of the summary statistics.

Table
Site Concentration Selection
N Waste

Area	Medium	Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for Statistics	Shapiro-Wilke's Test for Normality (a): Normal	Lognormal	Dataset Distribution	Summary Statistics: Minimum	Mean	Maximum	95% Upper Confidence Limit: t-Test	H-Test	UCL (b)	Site Concentration (c)
N	Waste	8280A	1998 Total TEQ w/ EMPC as ND	ug/kg	4	4	100%	4	0.69	0.98	Lognormal	3.90E-03	9.76E-02	3.45E-01	2.92E-01	2.91E+07	2.91E+07	3.45E-01
N	Waste	PEST	4,4' DDT	ug/kg dw	4	1	25%	4	0.69	0.71	Lognormal	1.75E+00	2.02E+00	2.70E+00	2.55E+00	2.82E+00	2.82E+00	2.70E+00
N	Waste	PEST	Aldrin	ug/kg dw	4	1	25%	3	0.76	0.76	Normal	9.00E-01	1.03E+00	1.28E+00	1.39E+00	1.65E+00	1.39E+00	1.28E+00
N	Waste	PEST	Alpha Chlordane	ug/kg dw	4	1	25%	3	0.75	0.76	Normal	9.00E-01	9.67E-01	1.10E+00	1.16E+00	1.22E+00	1.16E+00	1.10E+00
N	Waste	METALS	Aluminum	mg/kg dw	4	4	100%	4	0.86	0.89	Lognormal	7.50E+03	8.75E+03	1.10E+04	1.06E+04	1.14E+04	1.14E+04	1.10E+04
N	Waste	SVOA	Anthracene	ug/kg dw	4	3	75%	3	1.00	1.00	Normal	3.60E+01	4.70E+01	5.80E+01	6.55E+01	8.74E+01	6.55E+01	5.80E+01
N	Waste	METALS	Antimony	mg/kg dw	4	1	25%	1	NC	NC	NC	7.10E-01	7.10E-01	7.10E-01	NC	NC	NC	7.10E-01
N	Waste	METALS	Arsenic	mg/kg dw	4	4	100%	4	0.95	0.98	Lognormal	5.50E+00	6.33E+00	7.30E+00	7.20E+00	7.47E+00	7.47E+00	7.30E+00
N	Waste	METALS	Barium	mg/kg dw	4	4	100%	4	0.86	0.84	Normal	1.40E+02	5.83E+02	1.20E+03	1.21E+03	3.76E+05	1.21E+03	1.20E+03
N	Waste	SVOA	Benzo(a)anthracene	ug/kg dw	4	4	100%	4	0.94	0.94	Normal	7.00E+01	1.68E+02	2.70E+02	2.77E+02	1.37E+03	2.77E+02	2.70E+02
N	Waste	SVOA	Benzo(a)pyrene	ug/kg dw	4	4	100%	4	0.93	0.94	Lognormal	7.20E+01	1.87E+02	3.30E+02	3.28E+02	2.74E+03	2.74E+03	3.30E+02
N	Waste	SVOA	Benzo(b)fluoranthene	ug/kg dw	4	4	100%	4	0.93	0.97	Lognormal	5.90E+01	1.65E+02	3.20E+02	3.03E+02	3.55E+03	3.55E+03	3.20E+02
N	Waste	SVOA	Benzo(g,h,i)perylene	ug/kg dw	4	1	25%	4	0.65	0.66	Lognormal	9.00E+01	1.44E+02	3.00E+02	2.66E+02	9.66E+02	9.66E+02	3.00E+02
N	Waste	SVOA	Benzo(k)fluoranthene	ug/kg dw	4	4	100%	4	0.94	0.94	Normal	8.00E+01	2.18E+02	3.60E+02	3.70E+02	2.88E+03	3.70E+02	3.60E+02
N	Waste	PEST	beta-BHC	ug/kg dw	4	1	25%	3	0.75	0.75	Lognormal	2.70E-01	2.93E-01	3.38E-01	3.58E-01	3.82E-01	3.82E-01	3.38E-01
N	Waste	SVOA	bis(2-Ethylhexyl)phthalate	ug/kg dw	4	1	25%	4	0.72	0.73	Lognormal	9.00E+01	1.01E+02	1.30E+02	1.24E+02	1.33E+02	1.33E+02	1.30E+02
N	Waste	METALS	Cadmium	mg/kg dw	4	4	100%	4	0.96	0.98	Lognormal	3.00E-01	8.46E-01	1.50E+00	1.46E+00	1.18E+01	1.18E+01	1.50E+00
N	Waste	METALS	Calcium	mg/kg dw	4	4	100%	4	0.98	0.98	Lognormal	1.60E+04	5.73E+04	1.09E+05	1.04E+05	1.99E+06	1.99E+06	1.09E+05
N	Waste	METALS	Chromium	mg/kg dw	4	4	100%	4	0.63	0.63	Lognormal	1.20E+01	1.65E+01	1.80E+01	2.00E+01	2.29E+01	2.29E+01	1.80E+01
N	Waste	SVOA	Chrysene	ug/kg dw	4	4	100%	4	0.90	0.91	Lognormal	8.60E+01	2.00E+02	3.10E+02	3.26E+02	1.43E+03	1.43E+03	3.10E+02
N	Waste	METALS	Cobalt	mg/kg dw	4	4	100%	4	0.96	0.96	Lognormal	5.60E+00	5.84E+00	6.15E+00	6.12E+00	NC	NC	6.15E+00
N	Waste	METALS	Copper	mg/kg dw	4	4	100%	4	0.88	0.97	Lognormal	1.60E+01	5.01E+01	1.10E+02	1.00E+02	2.28E+03	2.28E+03	1.10E+02
N	Waste	SVOA	Dibenzo(a,h)anthracene	ug/kg dw	4	2	50%	4	0.88	0.87	Normal	4.80E+01	7.25E+01	1.10E+02	1.07E+02	1.78E+02	1.07E+02	1.07E+02
N	Waste	PEST	Dieldrin	ug/kg dw	4	1	25%	3	0.85	0.86	Lognormal	1.75E+00	1.89E+00	2.13E+00	2.23E+00	2.33E+00	2.33E+00	2.13E+00
N	Waste	SVOA	Fluoranthene	ug/kg dw	4	4	100%	4	0.96	0.95	Normal	1.70E+02	3.93E+02	6.10E+02	6.27E+02	2.44E+03	6.27E+02	6.10E+02
N	Waste	PEST	Gamma Chlordane	ug/kg dw	4	1	25%	4	0.73	0.73	Lognormal	9.00E-01	1.38E+00	1.85E+00	2.02E+00	3.73E+00	3.73E+00	1.85E+00
N	Waste	SVOA	Indeno(1,2,3-cd)pyrene	ug/kg dw	4	3	75%	4	0.85	0.88	Lognormal	8.75E+01	1.44E+02	2.50E+02	2.34E+02	5.70E+02	5.70E+02	2.50E+02
N	Waste	METALS	Iron	mg/kg dw	4	4	100%	4	0.88	0.86	Normal	1.30E+04	1.43E+04	1.50E+04	1.54E+04	NC	1.54E+04	1.50E+04
N	Waste	METALS	Lead	mg/kg dw	4	4	100%	4	0.77	0.81	Lognormal	1.90E+01	1.38E+02	4.10E+02	3.66E+02	5.63E+06	5.63E+06	4.10E+02
N	Waste	METALS	Magnesium	mg/kg dw	4	4	100%	4	0.79	0.83	Lognormal	6.20E+03	7.18E+03	1.15E+04	1.08E+04	1.59E+04	1.59E+04	1.15E+04
N	Waste	METALS	Manganese	mg/kg dw	4	4	100%	4	0.89	0.88	Normal	2.80E+02	3.74E+02	4.10E+02	4.47E+02	5.01E+02	4.47E+02	4.10E+02
N	Waste	METALS	Mercury	mg/kg dw	4	4	100%	4	0.84	0.86	Lognormal	3.10E-02	6.78E-02	9.50E-02	1.06E-01	3.52E-01	3.52E-01	9.50E-02
N	Waste	PEST	Methoxychlor	ug/kg dw	4	1	25%	4	0.84	0.85	Lognormal	9.00E+00	2.06E+01	5.50E+01	4.76E+01	1.40E+03	1.40E+03	5.50E+01
N	Waste	METALS	Molybdenum	mg/kg dw	4	4	100%	4	0.94	0.98	Lognormal	7.00E-01	1.03E+00	1.45E+00	1.39E+00	1.82E+00	1.82E+00	1.45E+00
N	Waste	METALS	Nickel	mg/kg dw	4	4	100%	4	0.97	0.97	Normal	1.50E+01	1.61E+01	1.70E+01	1.71E+01	NC	1.71E+01	1.70E+01
N	Waste	SVOA	Pentachlorophenol	ug/kg dw	4	4	100%	4	0.79	0.82	Lognormal	2.32E+02	3.07E+02	4.74E+02	4.42E+02	6.13E+02	6.13E+02	4.74E+02
N	Waste	SVOA	Phenanthrene	ug/kg dw	4	4	100%	4	0.97	0.90	Normal	8.00E+01	1.76E+02	2.60E+02	2.63E+02	7.22E+02	2.63E+02	2.60E+02
N	Waste	METALS	Potassium	mg/kg dw	4	4	100%	4	0.95	0.95	Normal	1.20E+03	1.40E+03	1.60E+03	1.61E+03	1.70E+03	1.61E+03	1.60E+03
N	Waste	SVOA	Pyrene	ug/kg dw	4	4	100%	4	0.97	0.97	Normal	1.50E+02	3.41E+02	5.50E+02	5.51E+02	2.15E+03	5.51E+02	5.50E+02
N	Waste	METALS	Selenium	mg/kg dw	4	1	25%	4	0.87	0.89	Lognormal	4.95E-01	5.69E-01	6.80E-01	6.61E-01	6.91E-01	6.91E-01	6.80E-01
N	Waste	PCB	Total PCBs	ug/kg dw	4	1	25%	4	0.83	0.84	Lognormal	9.00E+00	5.13E+01	1.78E+02	1.51E+02	5.08E+06	5.08E+06	1.78E+02
N	Waste	METALS	Vanadium	mg/kg dw	4	4	100%	4	0.83	0.85	Lognormal	2.10E+01	2.38E+01	2.90E+01	2.80E+01	2.94E+01	2.94E+01	2.90E+01
N	Waste	METALS	Zinc	mg/kg dw	4	4	100%	4	0.85	0.85	Normal	6.20E+01	1.49E+02	2.50E+02	2.61E+02	2.24E+03	2.61E+02	2.50E+02

B–3

TABLE
SAMPLES USED IN CALCULATION OF SITE CONCENTRATIONS
N Waste

Area	Medium	Sample	Date Collected	Beginning Depth (ft)	Ending Depth (ft)
N	Waste	WASTE-N-B1-0-0.5FT	11/30/99	0	0.5
N	Waste	WASTE-N-B2-0-0.5FT	11/30/99	0	0.5
N	Waste	WASTE-N-B3-0-0.5FT	11/30/99	0	0.5
N	Waste	WASTE-N-B4-0-0.5FT	12/2/99	0	0.5

* - multiple depths averaged together

Table
Site Concentration Selection
L Waste

Area	Medium	Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for Statistics	Shapiro-Wilke's Test for Normality(a)			Summary Statistics			95% Upper Confidence Limit			Site Concentration (c)
									Normal	Lognormal	Dataset Distribution	Minimum	Mean	Maximum	t-Test	H-Test	UCL (b)	
L	Waste	8280A	1998 Total TEQ w/ EMPC as ND	ug/kg	4	4	100%	4	0.87	0.89	Lognormal	9.32E-02	3.60E-01	8.21E-01	7.62E-01	1.25E+02	1.25E+02	8.21E-01
L	Waste	SVOA	2-Methylnaphthalene	ug/kg dw	4	1	25%	4.0000	0.7005	0.7155	Lognormal	9.00E+01	1.04E+02	1.40E+02	1.32E+02	1.47E+02	1.47E+02	1.40E+02
L	Waste	PEST	4,4'-DDE	ug/kg dw	4	3	75%	4	0.98	0.87	Normal	1.80E+00	1.10E+01	2.00E+01	1.97E+01	4.01E+03	1.97E+01	1.97E+01
L	Waste	PEST	4,4'-DDT	ug/kg dw	4	1	25%	4	0.94	0.85	Normal	1.80E+00	8.85E+00	1.60E+01	1.58E+01	1.07E+03	1.58E+01	1.58E+01
L	Waste	SVOA	Acenaphthene	ug/kg dw	4	2	50%	4.0000	0.6541	0.7405	Lognormal	9.00E+01	4.81E+02	1.60E+03	1.36E+03	8.49E+06	8.49E+06	1.60E+03
L	Waste	PEST	Aldrin	ug/kg dw	4	1	25%	4	0.64	0.74	Normal	9.00E-01	3.83E+00	5.50E+00	6.19E+00	1.79E+02	6.19E+00	5.50E+00
L	Waste	METALS	Aluminum	mg/kg dw	4	4	100%	4	0.93	0.92	Normal	3.50E+03	5.75E+03	7.60E+03	7.98E+03	1.24E+04	7.98E+03	7.60E+03
L	Waste	SVOA	Anthracene	ug/kg dw	4	3	75%	4	0.69	0.91	Lognormal	9.00E+01	1.05E+03	3.60E+03	3.08E+03	9.95E+08	9.95E+08	3.60E+03
L	Waste	METALS	Antimony	mg/kg dw	4	4	100%	4	0.87	0.94	Lognormal	2.00E+00	3.28E+00	5.40E+00	5.01E+00	8.85E+00	8.85E+00	5.40E+00
L	Waste	METALS	Arsenic	mg/kg dw	4	4	100%	4	0.92	0.92	Lognormal	3.00E+01	3.33E+01	3.70E+01	3.71E+01	NC	NC	3.70E+01
L	Waste	METALS	Barium	mg/kg dw	4	4	100%	4	0.95	0.88	Normal	8.30E+01	1.71E+02	2.50E+02	2.69E+02	1.43E+03	2.69E+02	2.50E+02
L	Waste	SVOA	Benzo(a)anthracene	ug/kg dw	4	3	75%	4.0000	0.7895	0.8958	Lognormal	9.00E+01	2.58E+03	7.80E+03	6.74E+03	3.28E+11	3.28E+11	7.80E+03
L	Waste	SVOA	Benzo(a)pyrene	ug/kg dw	4	3	75%	4.0000	0.7988	0.8830	Lognormal	4.90E+01	2.30E+03	7.00E+03	6.08E+03	3.48E+13	3.48E+13	7.00E+03
L	Waste	SVOA	Benzo(b)fluoranthene	ug/kg dw	4	3	75%	4	0.80	1.00	Lognormal	9.00E+01	2.19E+03	6.60E+03	5.72E+03	7.02E+10	7.02E+10	6.60E+03
L	Waste	SVOA	Benzo(g,h,i)perylene	ug/kg dw	4	3	75%	4	0.83	1.00	Lognormal	9.00E+01	1.33E+03	3.80E+03	3.33E+03	1.14E+09	1.14E+09	3.80E+03
L	Waste	SVOA	Benzo(k)fluoranthene	ug/kg dw	4	3	75%	4	0.81	0.99	Lognormal	9.00E+01	2.29E+03	6.80E+03	5.93E+03	2.12E+11	2.12E+11	6.80E+03
L	Waste	METALS	Beryllium	mg/kg dw	4	4	100%	4	0.88	0.87	Lognormal	1.40E+00	1.48E+00	1.60E+00	1.59E+00	NC	NC	1.60E+00
L	Waste	PEST	beta-BHC	ug/kg dw	4	1	25%	4	0.90	0.93	Lognormal	2.50E-01	1.66E+00	3.70E+00	3.37E+00	1.36E+03	1.36E+03	3.70E+00
L	Waste	SVOA	bis(2-Ethylhexyl)phthalate	ug/kg dw	4	2	50%	4	0.93	0.94	Lognormal	9.00E+01	1.90E+02	3.10E+02	2.97E+02	7.98E+02	7.98E+02	3.10E+02
L	Waste	METALS	Cadmium	mg/kg dw	4	4	100%	4	0.99	0.86	Normal	7.10E-01	8.60E+00	1.00E+01	1.02E+01	1.03E+04	1.02E+01	1.00E+01
L	Waste	METALS	Calcium	mg/kg dw	4	4	100%	4	0.65	0.74	Normal	2.80E+03	2.00E+04	2.90E+04	3.42E+04	1.65E+07	3.42E+04	2.90E+04
L	Waste	SVOA	Carbazole	ug/kg dw	4	3	75%	4.0000	0.6661	0.8445	Lognormal	9.00E+01	4.80E+02	1.50E+03	1.26E+03	1.62E+06	1.62E+06	1.50E+03
L	Waste	METALS	Chromium	mg/kg dw	4	4	100%	4	0.89	0.99	Lognormal	1.70E+01	4.53E+01	7.80E+01	7.61E+01	4.49E+02	4.49E+02	7.80E+01
L	Waste	SVOA	Chrysene	ug/kg dw	4	3	75%	4.0000	0.8098	0.9870	Lognormal	9.00E+01	2.64E+03	7.80E+03	6.78E+03	3.67E+11	3.67E+11	7.80E+03
L	Waste	METALS	Cobalt	mg/kg dw	4	4	100%	4	0.94	0.94	Lognormal	1.10E+01	1.38E+01	1.70E+01	1.70E+01	1.00E+01	1.90E+01	1.70E+01
L	Waste	METALS	Copper	mg/kg dw	4	4	100%	4	0.85	0.98	Lognormal	1.90E+02	1.76E+03	4.70E+03	4.19E+03	7.41E+07	7.41E+07	4.70E+03
L	Waste	METALS	Cyanide, Total	mg/kg dw	4	1	25%	4	0.64	0.64	Lognormal	2.70E-01	6.05E-01	1.60E+00	1.39E+00	3.66E+01	3.66E+01	1.60E+00
L	Waste	SVOA	Dibenzo(a,h)anthracene	ug/kg dw	4	2	50%	4.0000	0.8137	0.8571	Lognormal	4.90E+01	4.55E+02	1.30E+03	1.15E+03	5.64E+06	5.64E+06	1.30E+03
L	Waste	SVOA	Dibenzofuran	ug/kg dw	4	1	25%	4	0.64	0.65	Lognormal	9.00E+01	2.56E+02	7.50E+02	6.44E+02	8.24E+04	8.24E+04	7.50E+02
L	Waste	PEST	Dieldrin	ug/kg dw	4	1	25%	4	0.81	0.78	Normal	1.80E+00	7.83E+00	1.20E+01	1.29E+01	4.22E+02	1.29E+01	1.20E+01
L	Waste	PEST	Endrin ketone	ug/kg dw	4	3	75%	4	0.88	0.93	Lognormal	1.80E+00	1.23E+01	2.80E+01	2.54E+01	1.23E+04	1.23E+04	2.80E+01
L	Waste	SVOA	Fluoranthene	ug/kg dw	4	3	75%	4	0.78	0.97	Lognormal	9.00E+01	5.77E+03	1.80E+04	1.55E+04	1.57E+15	1.57E+15	1.80E+04
L	Waste	SVOA	Fluorene	ug/kg dw	4	2	50%	4.0000	0.8357	0.8801	Lognormal	9.00E+01	4.21E+02	1.40E+03	1.19E+03	5.72E+06	5.72E+06	1.40E+03
L	Waste	PEST	Gamma Chlordane	ug/kg dw	4	3	75%	4	0.99	0.82	Normal	9.00E-01	1.15E+01	2.10E+01	2.13E+01	5.86E+05	2.13E+01	2.10E+01
L	Waste	PEST	Heptachlor epoxide	ug/kg dw	4	3	75%	4	0.89	0.83	Normal	9.00E-01	5.85E+00	9.20E+00	1.05E+01	3.51E+03	1.05E+01	9.20E+00
L	Waste	SVOA	Indeno(1,2,3-cd)pyrene	ug/kg dw	4	3	75%	4	0.79	1.00	Lognormal	9.00E+01	1.58E+03	4.80E+03	4.16E+03	7.51E+09	7.51E+09	4.80E+03
L	Waste	METALS	Iron	mg/kg dw	4	4	100%	4	0.87	0.78	Normal	7.10E+03	2.30E+04	3.20E+04	3.61E+04	3.34E+05	3.61E+04	3.20E+04
L	Waste	METALS	Lead	mg/kg dw	4	4	100%	4	0.83	0.99	Lognormal	6.40E+01	3.69E+02	9.40E+02	8.29E+02	2.54E+05	2.54E+05	9.40E+02
L	Waste	METALS	Magnesium	mg/kg dw	4	4	100%	4	0.97	0.84	Normal	3.40E+02	2.49E+03	4.20E+03	4.45E+03	2.73E+06	4.45E+03	4.20E+03
L	Waste	METALS	Manganese	mg/kg dw	4	4	100%	4	0.98	0.85	Normal	2.30E+01	3.51E+02	6.50E+02	6.76E+02	8.86E+07	6.76E+02	6.50E+02
L	Waste	METALS	Mercury	mg/kg dw	4	4	100%	4	0.94	0.79	Normal	3.90E-02	3.22E-01	5.60E-01	5.74E-01	7.12E+02	5.74E-01	5.60E-01
L	Waste	PEST	Methoxychlor	ug/kg dw	4	2	50%	3	0.99	0.99	Normal	9.00E+00	2.63E+01	4.60E+01	5.77E+01	1.51E+04	5.77E+01	4.60E+01
L	Waste	METALS	Molybdenum	mg/kg dw	4	4	100%	4	0.88	0.88	Lognormal	9.30E+00	1.45E+01	2.30E+01	2.21E+01	4.26E+01	4.26E+01	2.30E+01
L	Waste	SVOA	Naphthalene	ug/kg dw	4	1	25%	4.0000	0.8454	0.8804	Lognormal	9.00E+01	1.49E+02	3.20E+02	2.83E+02	1.22E+03	1.22E+03	3.20E+02
L	Waste	METALS	Nickel	mg/kg dw	4	4	100%	4	0.86	0.96	Normal	3.80E+01	4.88E+01	6.50E+01	5.58E+01	8.04E+01	5.58E+01	5.50E+01
L	Waste	SVOA	Pentachlorophenol	ug/kg dw	4	1	25%	3.0000	0.7840	0.7836	Normal	2.35E+02	2.38E+02	2.40E+02	2.43E+02	NC	2.43E+02	2.40E+02
L	Waste	SVOA	Phenanthrene	ug/kg dw	4	3	75%	4.0000	0.7207	0.9705	Lognormal	9.00E+01	3.62E+03	1.20E+04	1.02E+04	7.19E+12	7.19E+12	1.20E+04
L	Waste	METALS	Potassium	mg/kg dw	4	4	100%	4	1.00	0.97	Normal	5.00E+02	1.09E+03	1.70E+03	1.68E+03	4.80E+03	1.68E+03	1.68E+03
L	Waste	SVOA	Pyrene	ug/kg dw	4	3	75%	4	0.79	0.97	Lognormal	9.00E+01	4.27E+03	1.30E+04	1.12E+04	4.88E+13	4.88E+13	1.30E+04
L	Waste	METALS	Selenium	mg/kg dw	4	4	100%	4	0.88	0.87	Lognormal	1.80E+00	3.08E+00	4.30E+00	4.58E+00	9.00E+00	9.00E+00	4.30E+00
L	Waste	METALS	Silver	mg/kg dw	4	1	75%	4	0.93	0.97	Lognormal	5.50E-01	8.13E-01	1.20E+00	1.14E+00	1.57E+00	1.57E+00	1.20E+00
L	Waste	METALS	Sodium	mg/kg dw	4	4	100%	4	0.90	0.90	Lognormal	2.10E+02	3.45E+02	5.40E+02	5.28E+02	1.09E+03	1.09E+03	5.40E+02
L	Waste	METALS	Thallium	mg/kg dw	4	4	100%	4	1.00	1.00	Normal	1.60E+00	1.85E+00	2.10E+00	2.09E+00	2.17E+00	2.09E+00	2.09E+00
L	Waste	VOA	Toluene	ug/kg dw	4	1	25%	4.0000	0.7518	0.8303	Lognormal	3.15E+00	8.08E+00	1.30E+01	1.18E+01	8.23E+01	8.23E+01	1.30E+01
L	Waste	PCB	Total PCBs	ug/kg dw	4	2	50%	4	0.92	0.84	Normal	9.00E+00	4.90E+02	1.17E+03	1.07E+03	2.53E+13	1.07E+03	1.07E+03
L	Waste	METALS	Vanadium	mg/kg dw	4	4	100%	4	0.77	0.78	Lognormal	3.90E+01	4.43E+01	4.90E+01	5.07E+01	5.30E+01	5.30E+01	4.90E+01
L	Waste	METALS	Zinc	mg/kg dw	4	4	100%	4	1.00	0.95	Normal	1.60E+02	5.10E+02	8.70E+02	8.81E+02	8.86E+03	8.81E+02	8.81E+02

TABLE
SAMPLES USED IN CALCULATION OF SITE CONCENTRATIONS
L Waste

Area	Medium	Sample	Date Collected	Beginning Depth (ft)	Ending Depth (ft)
L	Waste	WASTE-L-B1-0-0.5FT	9/27/99	0	0.5
L	Waste	WASTE-L-B2-0-0.5FT	9/27/99	0	0.5
L	Waste	WASTE-L-B3-0-0.5FT	9/27/99	0	0.5
L	Waste	WASTE-L-B4-0-0.5FT	9/27/99	0	0.5

* - multiple depths averaged together

Table
Site Concentration Selection
I Waste

Area	Medium	Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for Statistics	Shapiro-Wilke's Test for Normality(a): Normal	Lognormal	Dataset Distribution	Summary Statistics: Minimum	Mean	Maximum	95% Upper Confidence Limit: t-Test	H-Test	UCL (b)	Site Concentration (c)
I	Waste	SVOA	1,2,4-Trichlorobenzene	ug/kg dw	4	1	25%	4	0.87	0.69	Lognormal	8.50E+01	1.11E+02	1.80E+02	1.65E+02	2.38E+02	2.38E+02	1.80E+02
I	Waste	SVOA	1,4-Dichlorobenzene	ug/kg dw	4	1	25%	1	NC	NC	NC	4.60E+01	4.60E+01	4.60E+01	NC	NC	NC	4.60E+01
I	Waste	8280A	1998 Total TEQ w/ EMPC as ND	ug/kg	4	4	100%	4	0.88	0.88	Lognormal	7.23E-02	3.34E+00	1.27E+01	1.07E+01	5.83E+13	5.83E+13	1.27E+01
I	Waste	HERB	2,4-DB	ug/kg dw	4	1	25%	3	0.75	0.78	Lognormal	4.35E+00	1.27E+01	2.91E+01	3.87E+01	8.37E+05	8.37E+05	2.91E+01
I	Waste	SVOA	2,4-Dichlorophenol	ug/kg dw	4	1	25%	1	NC	NC	NC	8.20E+01	8.20E+01	8.20E+01	NC	NC	NC	8.20E+01
I	Waste	SVOA	2-Nitroaniline	ug/kg dw	4	1	25%	1	NC	NC	NC	1.60E+02	1.60E+02	1.60E+02	NC	NC	NC	1.60E+02
I	Waste	PEST	4,4'-DDD	ug/kg dw	3	3	100%	3	0.75	0.79	Lognormal	3.10E-01	6.69E+01	2.00E+02	2.81E+02	6.19E+56	6.19E+56	2.00E+02
I	Waste	PEST	4,4'-DDE	ug/kg dw	3	3	100%	3	0.78	0.95	Lognormal	1.55E+00	1.03E+02	3.00E+02	3.91E+02	1.36E+32	1.36E+32	3.00E+02
I	Waste	PEST	4,4'-DDT	ug/kg dw	3	2	67%	3	0.76	0.92	Lognormal	2.60E+00	1.57E+02	4.60E+02	5.99E+02	3.98E+32	3.98E+32	4.60E+02
I	Waste	SVOA	4-Chloroaniline	ug/kg dw	4	2	50%	4	0.63	0.69	Lognormal	1.65E+02	4.64E+03	1.80E+04	1.61E+04	3.35E+15	3.35E+15	1.80E+04
I	Waste	PEST	Aldrin	ug/kg dw	3	3	100%	3	0.78	0.93	Lognormal	8.20E-01	8.48E+01	2.50E+02	3.26E+02	2.37E+38	2.37E+38	2.50E+02
I	Waste	PEST	Alpha Chlordane	ug/kg dw	3	1	33%	1	NC	NC	NC	2.65E+00	2.65E+00	2.65E+00	NC	NC	NC	2.65E+00
I	Waste	METALS	Aluminum	mg/kg dw	4	4	100%	4	0.96	0.98	Lognormal	3.75E+03	5.84E+03	8.00E+03	7.71E+03	1.04E+04	1.04E+04	8.00E+03
I	Waste	SVOA	Anthracene	ug/kg dw	4	2	50%	4	0.71	0.92	Lognormal	2.85E+01	2.38E+02	7.30E+02	6.25E+02	3.37E+06	3.37E+06	7.30E+02
I	Waste	METALS	Antimony	mg/kg dw	4	4	100%	4	0.84	0.88	Lognormal	2.90E+00	6.06E+00	8.40E+00	9.34E+00	2.71E+01	2.71E+01	8.40E+00
I	Waste	METALS	Arsenic	mg/kg dw	4	4	100%	4	0.87	0.88	Normal	4.55E+00	7.79E+00	1.20E+01	1.21E+01	2.93E+01	1.21E+01	1.20E+01
I	Waste	METALS	Barium	mg/kg dw	4	4	100%	4	0.75	0.80	Lognormal	8.30E+01	2.81E+02	7.40E+02	8.45E+02	4.07E+04	4.07E+04	7.40E+02
I	Waste	SVOA	Benzo(a)anthracene	ug/kg dw	4	3	75%	4	0.69	0.85	Lognormal	7.80E+01	6.53E+02	2.20E+03	1.87E+03	1.36E+06	1.36E+06	2.20E+03
I	Waste	SVOA	Benzo(a)pyrene	ug/kg dw	4	3	75%	4	0.68	0.66	Lognormal	4.95E+01	6.29E+02	2.20E+03	1.86E+03	2.97E+09	2.97E+09	2.20E+03
I	Waste	SVOA	Benzo(b)fluoranthene	ug/kg dw	4	3	75%	4	0.67	0.82	Lognormal	9.50E+01	8.14E+02	2.80E+03	2.37E+03	4.06E+08	4.06E+08	2.80E+03
I	Waste	SVOA	Benzo(g,h,i)perylene	ug/kg dw	4	3	75%	4	0.68	0.78	Lognormal	9.00E+01	4.88E+02	1.60E+03	1.36E+03	5.62E+08	5.62E+08	1.60E+03
I	Waste	SVOA	Benzo(k)fluoranthene	ug/kg dw	4	3	75%	4	0.70	0.87	Lognormal	5.50E+01	3.10E+02	9.80E+02	8.21E+02	1.05E+08	1.05E+08	9.80E+02
I	Waste	METALS	Beryllium	mg/kg dw	4	4	100%	4	0.84	0.93	Lognormal	4.60E-01	9.10E-01	1.70E+00	1.55E+00	4.65E+00	4.65E+00	1.70E+00
I	Waste	SVOA	bis(2-Ethylhexyl)phthalate	ug/kg dw	4	1	25%	1	NC	NC	NC	8.75E+01	8.75E+01	8.75E+01	NC	NC	NC	8.75E+01
I	Waste	METALS	Cadmium	mg/kg dw	4	4	100%	4	0.79	0.88	Lognormal	2.20E+00	1.12E+01	3.10E+01	2.72E+01	4.57E+04	4.67E+04	3.10E+01
I	Waste	METALS	Calcium	mg/kg dw	4	4	100%	4	0.92	0.92	Lognormal	9.20E+04	1.57E+05	2.35E+05	2.36E+05	4.80E+05	4.80E+05	2.35E+05
I	Waste	SVOA	Carbazole	ug/kg dw	4	1	25%	4	0.68	0.70	Lognormal	8.50E+01	1.48E+02	3.20E+02	2.83E+02	1.30E+03	1.30E+03	3.20E+02
I	Waste	METALS	Chromium	mg/kg dw	4	4	100%	4	0.91	0.98	Lognormal	1.30E+01	3.33E+01	6.50E+01	6.10E+01	6.57E+02	6.57E+02	6.50E+01
I	Waste	SVOA	Chrysene	ug/kg dw	4	3	75%	4	0.68	0.63	Lognormal	9.50E+01	6.62E+02	2.20E+03	1.87E+03	6.53E+07	5.53E+07	2.20E+03
I	Waste	METALS	Cobalt	mg/kg dw	4	4	100%	4	0.79	0.98	Lognormal	2.00E+00	1.21E+01	3.30E+01	2.88E+01	1.80E+04	1.80E+04	3.30E+01
I	Waste	METALS	Copper	mg/kg dw	4	4	100%	4	0.85	0.83	Normal	1.65E+03	6.66E+03	1.30E+04	1.34E+04	2.97E+08	1.34E+04	1.30E+04
I	Waste	SVOA	Dibenzo(a,h)anthracene	ug/kg dw	4	2	50%	4	0.66	0.74	Lognormal	3.65E+01	1.23E+02	3.60E+02	3.09E+02	4.44E+04	4.44E+04	3.60E+02
I	Waste	SVOA	Dibenzofuran	ug/kg dw	4	1	25%	4	0.99	0.99	Normal	8.50E+01	9.25E+01	1.00E+02	1.00E+02	NC	1.00E+02	1.00E+02
I	Waste	PEST	Dieldrin	ug/kg dw	3	3	100%	3	0.78	0.96	Lognormal	1.70E+00	7.04E+01	2.00E+02	2.60E+02	6.87E+25	6.87E+25	2.00E+02
I	Waste	SVOA	Di-n-butylphthalate	ug/kg dw	4	1	25%	1	NC	NC	NC	5.20E+01	5.20E+01	5.20E+01	NC	NC	NC	5.20E+01
I	Waste	PEST	Endosulfan I	ug/kg dw	3	3	100%	3	0.76	0.97	Lognormal	7.20E-01	8.88E+01	2.60E+02	3.39E+02	6.21E+38	6.21E+38	2.60E+02
I	Waste	PEST	Endosulfan II	ug/kg dw	3	3	100%	3	0.77	0.97	Lognormal	2.25E+00	2.06E+02	6.00E+02	7.81E+02	3.87E+35	3.87E+35	6.00E+02
I	Waste	PEST	Endosulfan sulfate	ug/kg dw	3	1	33%	2	1.00	1.00	Normal	8.50E+00	8.65E+00	8.80E+00	9.60E+00	NC	9.60E+00	8.80E+00
I	Waste	PEST	Endrin	ug/kg dw	3	3	100%	3	0.77	0.96	Lognormal	9.10E-01	8.22E+01	2.40E+02	3.13E+02	1.44E+35	1.44E+35	2.40E+02
I	Waste	PEST	Endrin aldehyde	ug/kg dw	3	3	100%	3	0.77	0.88	Lognormal	4.70E+00	5.15E+02	1.50E+03	1.95E+03	5.90E+37	5.90E+37	1.50E+03
I	Waste	PEST	Endrin ketone	ug/kg dw	3	3	100%	3	0.77	0.97	Lognormal	3.20E+00	2.42E+02	7.00E+02	9.11E+02	1.29E+33	1.29E+33	7.00E+02
I	Waste	SVOA	Fluoranthene	ug/kg dw	4	4	100%	4	0.66	0.64	Lognormal	1.20E+02	1.68E+03	6.00E+03	5.07E+03	2.32E+10	2.32E+10	6.00E+03
I	Waste	SVOA	Fluorene	ug/kg dw	4	1	25%	4	0.68	0.72	Lognormal	8.50E+01	1.25E+02	2.30E+02	2.08E+02	4.33E+02	4.33E+02	2.30E+02
I	Waste	PEST	Gamma Chlordane	ug/kg dw	3	3	100%	3	0.76	0.83	Lognormal	5.55E+00	1.32E+02	3.80E+02	4.94E+02	1.18E+24	1.18E+24	3.80E+02
I	Waste	PEST	Heptachlor	ug/kg dw	3	2	67%	3	0.79	0.98	Lognormal	8.55E-01	2.48E+01	6.90E+01	8.94E+01	3.91E+21	3.91E+21	6.90E+01
I	Waste	PEST	Heptachlor epoxide	ug/kg dw	3	3	100%	3	0.77	0.96	Lognormal	9.40E-01	4.85E+01	1.40E+02	1.82E+02	3.61E+28	3.51E+28	1.40E+02
I	Waste	SVOA	Hexachlorobenzene	ug/kg dw	4	1	25%	4	0.68	0.68	Lognormal	3.53E+01	5.48E+01	1.10E+02	9.81E+01	2.92E+02	2.92E+02	1.10E+02
I	Waste	SVOA	Indeno(1,2,3-cd)pyrene	ug/kg dw	4	2	50%	4	0.66	0.78	Lognormal	9.00E+01	4.84E+02	1.60E+03	1.36E+03	7.84E+08	7.64E+08	1.60E+03
I	Waste	METALS	Iron	mg/kg dw	4	4	100%	4	1.00	0.95	Normal	5.35E+03	1.08E+04	1.60E+04	1.60E+04	3.88E+04	1.60E+04	1.60E+04
I	Waste	METALS	Lead	mg/kg dw	4	4	100%	4	0.87	0.88	Normal	2.20E+02	8.95E+02	1.50E+03	1.41E+03	9.07E+04	1.41E+03	1.41E+03
I	Waste	METALS	Magnesium	mg/kg dw	4	4	100%	4	0.93	0.98	Lognormal	7.60E+03	1.24E+04	1.90E+04	1.80E+04	2.87E+04	2.87E+04	1.90E+04
I	Waste	METALS	Manganese	mg/kg dw	4	4	100%	4	0.77	0.80	Lognormal	1.60E+02	2.03E+02	3.00E+02	2.81E+02	3.56E+02	3.56E+02	3.00E+02
I	Waste	METALS	Mercury	mg/kg dw	4	4	100%	4	0.72	0.89	Lognormal	4.75E-02	6.04E-01	2.00E+00	1.71E+00	5.71E+08	5.71E+08	2.00E+00
I	Waste	PEST	Methoxychlor	ug/kg dw	3	3	100%	3	0.78	0.94	Lognormal	1.60E+01	1.03E+03	3.00E+03	3.91E+03	1.37E+33	1.37E+33	3.00E+03
I	Waste	METALS	Molybdenum	mg/kg dw	4	4	100%	4	0.95	0.92	Normal	2.70E+00	5.88E+00	8.50E+00	8.97E+00	2.65E+01	8.97E+00	8.50E+00
I	Waste	METALS	Nickel	mg/kg dw	4	4	100%	4	0.92	0.95	Lognormal	1.45E+01	3.54E+01	6.50E+01	6.25E+01	4.48E+02	4.48E+02	6.50E+01
I	Waste	SVOA	Pentachlorophenol	ug/kg dw	4	4	100%	4	0.73	0.84	Lognormal	2.20E+02	6.34E+02	1.65E+03	1.44E+03	6.33E+04	6.33E+04	1.65E+03
I	Waste	SVOA	Phenanthrene	ug/kg dw	4	4	100%	4	0.64	0.76	Lognormal	5.00E+01	8.80E+02	3.30E+03	2.78E+03	3.21E+11	3.21E+11	3.30E+03
I	Waste	METALS	Potassium	mg/kg dw	4	4	100%	4	0.93	0.93	Lognormal	1.05E+03	1.24E+03	1.50E+03	1.48E+03	1.59E+03	1.59E+03	1.50E+03
I	Waste	SVOA	Pyrene	ug/kg dw	4	4	100%	4	0.87	0.83	Lognormal	1.40E+02	1.35E+03	4.70E+03	3.98E+03	1.14E+09	1.14E+09	4.70E+03
I	Waste	METALS	Selenium	mg/kg dw	4	3	75%	4	0.77	0.79	Lognormal	5.50E-01	1.10E+00	1.60E+00	1.78E+00	6.89E+00	6.89E+00	1.60E+00
I	Waste	METALS	Silver	mg/kg dw	4	4	100%	4	0.91	0.94	Lognormal	1.75E+00	8.71E+00	1.90E+01	1.81E+01	5.71E+03	5.71E+03	1.90E+01
I	Waste	METALS	Sodium	mg/kg dw	4	4	100%	4	0.87	0.88	Normal	4.40E+02	6.35E+02	8.70E+02	8.86E+02	1.29E+03	8.86E+02	8.70E+02
I	Waste	VOA	Toluene	ug/kg dw	4	1	25%	4	0.85	0.94	Normal	2.35E+00	2.89E+00	3.30E+00	3.39E+00	3.64E+00	3.39E+00	3.30E+00
I	Waste	PCB	Total PCBs	ug/kg dw	4	3	75%	4	0.65	0.98	Lognormal	6.10E+01	3.13E+04	1.21E+05	1.02E+05	8.78E+28	8.78E+28	1.21E+05
I	Waste	METALS	Vanadium	mg/kg dw	4	4	100%	4	1.00	0.98	Normal	1.07E+01	1.87E+01	2.60E+01	2.63E+01	4.38E+01	2.63E+01	2.60E+01
I	Waste	METALS	Zinc	mg/kg dw	4	4	100%	4	0.92	0.95	Lognormal	4.05E+02	1.43E+03	2.80E+03	2.60E+03	4.33E+01	4.33E+04	2.80E+03

B-7

TABLE
SAMPLES USED IN CALCULATION OF SITE CONCENTRATIONS
I Waste

Area	Medium	Sample	Date Collected	Beginning Depth (ft)	Ending Depth (ft)
I	Waste	WASTE-I-B1-0-0.5FT	10/13/99	0	0.5
I	Waste	WASTE-I-B2-0-0.5FT	10/13/99	0	0.5
I	Waste	WASTE-I-B3-0-0.5FT	10/13/99	0	0.5
I	Waste	WASTE-I-B4-0-0.5FT	10/14/99	0	0.5

* - multiple depths averaged together

Table
Site Concentration Selection
H Waste

Area	Medium	Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for Statistics	Shapiro-Wilke's Test for Normality(a)			Summary Statistics			95% Upper Confidence Limit			Site Concentration (c)
									Normal	Lognormal	Dataset Distribution	Minimum	Mean	Maximum	t-Test	H-Test	UCL (b)	
H	Waste	8280A	1998 Total TEQ w/ EMPC as ND	ug/kg	4	4	100%	4	0.92	0.94	Lognormal	3.45E-02	5.33E-01	1.29E+00	1.17E+00	1.77E+05	1.77E+05	1.29E+00
H	Waste	HERB	2,4-DB	ug/kg dw	4	2	50%	4	0.65	0.84	Normal	4.30E+00	6.74E+00	9.70E+00	9.94E+00	1.83E+01	9.94E+00	9.70E+00
H	Waste	VOA	2-Hexanone	ug/kg dw	4	1	25%	1	NC	NC	NC	5.70E+00	5.70E+00	5.70E+00	NC	NC	NC	5.70E+00
H	Waste	PEST	4,4'-DDE	ug/kg dw	4	3	75%	4	0.90	0.95	Lognormal	1.70E+00	3.44E+01	8.60E+01	8.03E+01	8.00E+08	8.00E+08	8.60E+01
H	Waste	PEST	4,4'-DDT	ug/kg dw	4	3	75%	4	0.90	0.94	Lognormal	1.70E+00	4.51E+01	1.10E+02	1.04E+02	1.17E+10	1.17E+10	1.10E+02
H	Waste	PEST	Aldrin	ug/kg dw	4	2	50%	4	0.86	0.83	Normal	9.00E-01	8.21E+00	2.10E+01	1.94E+01	9.33E+06	1.94E+01	1.94E+01
H	Waste	METALS	Aluminum	mg/kg dw	4	4	100%	4	0.89	0.93	Lognormal	4.30E+03	7.95E+03	1.40E+04	1.32E+04	3.92E+04	3.92E+04	1.40E+01
H	Waste	METALS	Antimony	mg/kg dw	4	4	100%	4	0.98	0.81	Normal	8.90E-01	1.57E+00	2.30E+00	2.37E+00	7.15E+00	2.37E+00	2.30E+00
H	Waste	METALS	Arsenic	mg/kg dw	4	4	100%	4	0.71	0.84	Lognormal	6.50E+00	2.28E+01	6.40E+01	5.53E+01	7.22E+03	7.22E+03	6.40E+01
H	Waste	METALS	Barium	mg/kg dw	4	4	100%	4	0.88	0.86	Normal	9.90E+01	1.12E+02	1.20E+02	1.24E+02	NC	1.24E+02	1.20E+02
H	Waste	SVOA	Benzo(a)anthracene	ug/kg dw	4	3	75%	4	0.8283	0.8559	Lognormal	9.00E+01	1.04E+02	1.30E+02	1.25E+02	1.33E+02	1.33E+02	1.30E+02
H	Waste	SVOA	Benzo(a)pyrene	ug/kg dw	4	3	75%	4	0.95	0.88	Normal	4.70E+01	9.93E+01	1.40E+02	1.45E+02	3.50E+02	1.45E+02	1.40E+02
H	Waste	SVOA	Benzo(b)fluoranthene	ug/kg dw	4	3	75%	4	0.98	0.97	Lognormal	9.00E+01	1.13E+02	1.40E+02	1.39E+02	1.54E+02	1.54E+02	1.40E+02
H	Waste	SVOA	Benzo(g,h,i)perylene	ug/kg dw	4	1	25%	4	0.64	0.66	Lognormal	9.00E+01	1.61E+02	3.70E+02	3.25E+02	2.17E+03	2.17E+03	3.70E+02
H	Waste	SVOA	Benzo(k)fluoranthene	ug/kg dw	4	3	75%	4	0.78	0.79	Lognormal	8.20E+01	9.68E+01	1.30E+02	1.23E+02	1.37E+02	1.37E+02	1.30E+02
H	Waste	METALS	Beryllium	mg/kg dw	4	4	100%	4	0.65	0.69	Lognormal	7.30E-01	1.62E+00	3.80E+00	3.31E+00	4.69E+01	4.69E+01	3.80E+00
H	Waste	SVOA	bis(2-Ethylhexyl)phthalate	ug/kg dw	4	2	50%	4	0.94	0.94	Lognormal	9.00E+01	1.04E+02	1.20E+02	1.20E+02	1.26E+02	1.26E+02	1.20E+02
H	Waste	METALS	Cadmium	mg/kg dw	4	4	100%	4	0.82	0.87	Lognormal	2.70E+00	9.03E+00	2.20E+01	1.97E+01	2.17E+03	2.17E+03	2.20E+01
H	Waste	METALS	Calcium	mg/kg dw	4	4	100%	4	0.81	0.92	Lognormal	5.90E+03	1.78E+04	4.20E+04	3.73E+04	1.07E+06	1.07E+06	4.20E+04
H	Waste	VOA	Carbon disulfide	ug/kg dw	4	1	25%	3	0.9997	0.9966	Normal	2.65E+00	3.42E+00	4.30E+00	4.89E+00	6.98E+00	4.89E+00	4.30E+00
H	Waste	METALS	Chromium	mg/kg dw	4	4	100%	4	0.92	0.89	Normal	1.50E+01	1.95E+01	2.30E+01	2.34E+01	2.58E+01	2.34E+01	2.30E+01
H	Waste	SVOA	Chrysene	ug/kg dw	4	3	75%	4	0.78	0.87	Lognormal	9.00E+01	1.58E+02	3.00E+02	2.71E+02	7.34E+02	7.34E+02	3.00E+02
H	Waste	METALS	Cobalt	mg/kg dw	4	4	100%	4	0.82	0.87	Lognormal	5.20E+00	1.00E+01	2.00E+01	1.82E+01	8.81E+01	8.81E+01	2.00E+01
H	Waste	METALS	Copper	mg/kg dw	4	4	100%	4	0.88	0.85	Normal	2.00E+02	3.75E+02	4.80E+02	5.33E+02	1.01E+03	5.33E+02	4.80E+02
H	Waste	PEST	Endosulfan II	ug/kg dw	4	1	25%	3	0.78	0.78	Lognormal	1.70E+00	3.57E+00	7.20E+00	8.87E+00	1.65E+03	1.65E+03	7.20E+00
H	Waste	PEST	Endrin ketone	ug/kg dw	4	3	75%	4	0.75	0.89	Lognormal	1.40E+00	2.50E+01	8.20E+01	7.03E+01	1.02E+10	1.02E+10	8.20E+01
H	Waste	SVOA	Fluoranthene	ug/kg dw	4	3	75%	4	0.98	0.94	Normal	9.00E+01	1.70E+02	2.40E+02	2.50E+02	5.21E+02	2.50E+02	2.40E+02
H	Waste	PEST	Gamma Chlordane	ug/kg dw	4	2	60%	4	0.78	0.75	Normal	9.00E-01	1.47E+01	3.00E+01	3.35E+01	1.92E+10	3.35E+01	3.00E+01
H	Waste	PEST	Heptachlor	ug/kg dw	4	1	25%	3	0.78	0.80	Lognormal	9.00E-01	1.26E+00	2.00E+00	2.33E+00	8.26E+00	8.26E+00	2.00E+00
H	Waste	PEST	Heptachlor epoxide	ug/kg dw	4	3	75%	4	0.86	0.88	Lognormal	5.90E-01	1.64E+01	4.40E+01	4.05E+01	1.11E+12	1.11E+12	4.40E+01
H	Waste	SVOA	Indeno(1,2,3-cd)pyrene	ug/kg dw	4	2	50%	4	0.82	0.83	Lognormal	8.70E+01	9.18E+01	1.00E+02	9.84E+01	NC	NC	1.00E+02
H	Waste	METALS	Iron	mg/kg dw	4	4	100%	4	0.97	0.98	Normal	1.40E+04	1.63E+04	1.80E+04	1.83E+04	1.89E+04	1.83E+04	1.80E+04
H	Waste	METALS	Lead	mg/kg dw	4	4	100%	4	0.92	0.92	Normal	5.30E+01	1.48E+02	2.30E+02	2.44E+02	1.78E+03	2.44E+02	2.30E+02
H	Waste	METALS	Magnesium	mg/kg dw	4	4	100%	4	0.87	0.65	Normal	6.90E+02	2.02E+03	2.50E+03	3.07E+03	1.90E+04	3.07E+03	2.50E+03
H	Waste	METALS	Manganese	mg/kg dw	4	4	100%	4	0.95	0.83	Normal	9.80E+01	4.37E+02	7.20E+02	7.39E+02	2.81E+04	7.39E+02	7.20E+02
H	Waste	METALS	Mercury	mg/kg dw	4	4	100%	4	0.77	0.94	Lognormal	6.40E-02	2.84E-01	7.70E-01	6.71E-01	1.42E+02	1.42E+02	7.70E-01
H	Waste	PEST	Methoxychlor	ug/kg dw	4	2	50%	4	0.78	0.87	Lognormal	9.00E+00	4.54E+01	1.30E+02	1.13E+02	2.00E+05	2.00E+05	1.30E+02
H	Waste	METALS	Molybdenum	mg/kg dw	4	4	100%	4	0.89	0.98	Lognormal	9.80E-01	4.85E+00	1.10E+01	9.97E+00	9.82E+02	9.82E+02	1.10E+01
H	Waste	METALS	Nickel	mg/kg dw	4	4	100%	4	0.68	0.73	Lognormal	2.00E+01	3.40E+01	7.00E+01	6.23E+01	2.15E+02	2.15E+02	7.00E+01
H	Waste	SVOA	Pentachlorophenol	ug/kg dw	4	1	25%	4	0.8193	0.8173	Normal	2.25E+02	2.32E+02	2.41E+02	2.41E+02	NC	2.41E+02	2.41E+02
H	Waste	SVOA	Phenanthrene	ug/kg dw	4	1	25%	4	0.7913	0.8009	Lognormal	9.00E+01	9.63E+01	1.10E+02	1.07E+02	NC	NC	1.10E+02
H	Waste	METALS	Potassium	mg/kg dw	4	4	100%	4	0.90	0.94	Lognormal	8.30E+02	1.18E+03	1.60E+03	1.54E+03	1.89E+03	1.89E+03	1.60E+03
H	Waste	SVOA	Pyrene	ug/kg dw	4	3	75%	4	0.81	0.78	Normal	9.00E+01	1.58E+02	1.90E+02	2.13E+02	3.38E+02	2.13E+02	1.90E+02
H	Waste	METALS	Selenium	mg/kg dw	4	3	75%	4	0.87	0.77	Lognormal	4.20E-01	1.58E+00	4.70E+00	4.03E+00	9.42E+02	9.42E+02	4.70E+00
H	Waste	METALS	Silver	mg/kg dw	4	3	75%	4	0.87	0.85	Normal	5.10E-01	1.39E+00	2.70E+00	2.64E+00	6.13E+01	2.64E+00	2.64E+00
H	Waste	METALS	Sodium	mg/kg dw	4	4	100%	4	0.98	0.98	Normal	1.10E+02	2.48E+02	3.90E+02	3.98E+02	1.46E+03	3.98E+02	3.90E+02
H	Waste	VOA	Tetrachloroethene	ug/kg dw	4	1	25%	4	0.7068	0.8198	Lognormal	2.55E+00	6.73E+00	1.70E+01	1.48E+01	2.98E+02	2.98E+02	1.70E+01
H	Waste	METALS	Thallium	mg/kg dw	4	1	25%	4	0.66	0.70	Lognormal	4.70E-01	1.01E+00	2.50E+00	2.18E+00	3.00E+01	3.00E+01	2.50E+00
H	Waste	PCB	Total PCBs	ug/kg dw	4	3	75%	4	0.84	0.82	Normal	8.50E+00	6.60E+02	1.52E+03	1.56E+03	1.34E+20	1.56E+03	1.52E+03
H	Waste	METALS	Vanadium	mg/kg dw	4	4	100%	4	0.91	0.93	Lognormal	2.00E+01	3.00E+01	4.50E+01	4.38E+01	8.90E+01	8.80E+01	4.50E+01
H	Waste	METALS	Zinc	mg/kg dw	4	4	100%	4	0.73	0.85	Lognormal	3.50E+02	1.28E+03	3.60E+03	3.12E+03	8.29E+05	8.29E+05	3.60E+03

B-9

TABLE
SAMPLES USED IN CALCULATION OF SITE CONCENTRATIONS
H Waste

Area	Medium	Sample	Date Collected	Beginning Depth (ft)	Ending Depth (ft)
H	Waste	WASTE-H-B1-0-0.5FT	9/27/99	0	0.5
H	Waste	WASTE-H-B2-0-0.5FT	9/27/99	0	0.5
H	Waste	WASTE-H-B3-0-0.5FT	9/27/99	0	0.5
H	Waste	WASTE-H-B4-0-0.5FT	9/27/99	0	0.5

* - multiple depths averaged together

Table
Site Concentration Selection
G Waste

Area	Medium	Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for Statistics	Shapiro-Wilke's Test for Normality(a) Normal	Lognormal	Dataset Distribution	Summary Statistics Minimum	Mean	Maximum	95% Upper Confidence Limit t-Test	H-Test	UCL (b)	Site Concentration (c)
G	Waste	8280A	1998 Total TEQ w/ EMPC as ND	ug/kg	4	4	100%	4	0.75	0.88	Lognormal	8.13E-04	3.05E-03	8.35E-03	7.27E-03	1.32E+00	1.32E+00	8.35E-03
G	Waste	PEST	4,4'-DDT	ug/kg dw	4	3	75%	3	0.90	0.93	Lognormal	8.45E-02	1.15E-01	1.60E-01	1.82E-01	3.31E-01	3.31E-01	1.60E-01
G	Waste	PEST	Alpha Chlordane	ug/kg dw	4	2	50%	2	1.00	1.00	Normal	1.20E-01	1.90E-01	2.60E-01	6.32E-01	NC	6.32E-01	2.60E-01
G	Waste	METALS	Aluminum	mg/kg dw	4	4	100%	4	0.85	0.81	Normal	9.30E+03	1.30E+04	1.50E+04	1.59E+04	1.65E+04	1.59E+04	1.50E+04
G	Waste	METALS	Antimony	mg/kg dw	4	2	50%	2	1.00	1.00	Normal	6.50E-01	6.85E-01	7.20E-01	9.06E-01	NC	9.06E-01	7.20E-01
G	Waste	METALS	Arsenic	mg/kg dw	4	4	100%	4	0.82	0.82	Normal	6.50E+00	7.18E+00	8.05E+00	8.14E+00	8.43E+00	8.14E+00	8.05E+00
G	Waste	METALS	Barium	mg/kg dw	4	4	100%	4	0.88	0.84	Normal	7.90E+01	1.17E+02	1.40E+02	1.49E+02	1.65E+02	1.49E+02	1.40E+02
G	Waste	METALS	Beryllium	mg/kg dw	4	4	100%	4	0.92	0.91	Normal	5.10E-01	5.89E-01	6.40E-01	6.57E-01	6.79E-01	6.57E-01	6.40E-01
G	Waste	METALS	Cadmium	mg/kg dw	4	4	100%	4	0.89	0.95	Lognormal	1.60E-01	2.60E-01	3.90E-01	3.67E-01	5.04E-01	5.04E-01	3.90E-01
G	Waste	METALS	Calcium	mg/kg dw	4	4	100%	4	0.95	0.91	Normal	5.10E+03	9.73E+03	1.40E+04	1.40E+04	2.72E+04	1.40E+04	1.40E+04
G	Waste	METALS	Chromium	mg/kg dw	4	4	100%	4	0.87	0.84	Normal	1.50E+01	1.93E+01	2.20E+01	2.28E+01	2.49E+01	2.28E+01	2.20E+01
G	Waste	METALS	Cobalt	mg/kg dw	4	4	100%	4	0.97	0.95	Normal	5.80E+00	7.33E+00	8.60E+00	8.69E+00	9.43E+00	8.69E+00	8.60E+00
G	Waste	METALS	Copper	mg/kg dw	4	4	100%	4	0.97	0.99	Lognormal	1.00E+02	1.63E+02	2.90E+02	2.80E+02	6.00E+02	6.00E+02	2.90E+02
G	Waste	PEST	delta BHC	ug/kg dw	4	3	75%	3	0.82	0.87	Lognormal	6.80E-02	1.03E-01	1.82E-01	2.18E-01	3.40E+00	3.40E+00	1.82E-01
G	Waste	PEST	Dieldrin	ug/kg dw	4	1	25%	1	NC	NC	NC	8.20E-02	8.20E-02	8.20E-02	NC	NC	NC	8.20E-02
G	Waste	PEST	Endosulfan I	ug/kg dw	4	1	25%	1	NC	NC	NC	2.20E-01	2.20E-01	2.20E-01	NC	NC	NC	2.20E-01
G	Waste	PEST	Endosulfan II	ug/kg dw	4	1	25%	1	NC	NC	NC	3.40E-01	3.40E-01	3.40E-01	NC	NC	NC	3.40E-01
G	Waste	PEST	Endosulfan sulfate	ug/kg dw	4	2	50%	2	1.00	1.00	Normal	1.20E-01	1.50E-01	1.80E-01	3.39E-01	NC	3.39E-01	1.80E-01
G	Waste	PEST	Endrin	ug/kg dw	4	2	50%	2	1.00	1.00	Normal	1.40E-01	1.48E-01	1.55E-01	1.95E-01	NC	1.95E-01	1.55E-01
G	Waste	PEST	Endrin aldehyde	ug/kg dw	4	2	50%	2	1.00	1.00	Lognormal	1.20E-01	3.95E-01	6.70E-01	2.13E+00	NC	NC	6.70E-01
G	Waste	PEST	Endrin ketone	ug/kg dw	4	2	50%	2	1.00	1.00	Normal	7.90E-01	9.10E-01	1.03E+00	1.67E+00	NC	1.67E+00	1.03E+00
G	Waste	PEST	Gamma Chlordane	ug/kg dw	4	3	75%	3	0.98	0.92	Normal	7.70E-02	2.02E-01	3.10E-01	4.00E-01	2.90E+01	4.00E-01	3.10E-01
G	Waste	PEST	Heptachlor epoxide	ug/kg dw	4	1	25%	1	NC	NC	NC	2.20E-01	2.20E-01	2.20E-01	NC	NC	NC	2.20E-01
G	Waste	METALS	Iron	mg/kg dw	4	4	100%	4	0.93	0.92	Normal	1.60E+04	1.84E+04	2.00E+04	2.05E+04	2.11E+04	2.05E+04	2.00E+04
G	Waste	METALS	Lead	mg/kg dw	4	4	100%	4	0.87	0.87	Lognormal	1.10E+01	1.38E+01	1.60E+01	1.66E+01	1.83E+01	1.83E+01	1.60E+01
G	Waste	METALS	Magnesium	mg/kg dw	4	4	100%	4	0.93	0.93	Lognormal	3.30E+03	4.09E+03	4.95E+03	4.99E+03	5.52E+03	5.52E+03	4.95E+03
G	Waste	METALS	Manganese	mg/kg dw	4	4	100%	4	0.84	0.86	Normal	2.60E+02	5.44E+02	7.40E+02	7.86E+02	1.85E+03	7.86E+02	7.40E+02
G	Waste	METALS	Mercury	mg/kg dw	4	4	100%	4	0.81	0.78	Normal	1.50E-02	2.45E-02	2.90E-02	3.23E-02	4.55E-02	3.23E-02	2.90E-02
G	Waste	PEST	Methoxychlor	ug/kg dw	4	1	25%	1	NC	NC	NC	9.40E-01	9.40E-01	9.40E-01	NC	NC	NC	9.40E-01
G	Waste	METALS	Molybdenum	mg/kg dw	4	4	100%	4	0.84	0.90	Lognormal	3.80E-01	5.19E-01	7.60E-01	7.31E-01	9.75E-01	9.75E-01	7.60E-01
G	Waste	METALS	Nickel	mg/kg dw	4	4	100%	4	0.95	0.96	Lognormal	1.70E+01	1.89E+01	2.15E+01	2.11E+01	2.17E+01	2.17E+01	2.15E+01
G	Waste	METALS	Potassium	mg/kg dw	4	4	100%	4	0.91	0.91	Lognormal	1.20E+03	1.45E+03	1.70E+03	1.73E+03	1.87E+03	1.87E+03	1.70E+03
G	Waste	PCB	Total PCBs	ug/kg dw	4	2	50%	4	0.65	0.69	Lognormal	7.90E+00	1.81E+01	4.65E+01	4.04E+01	7.79E+02	7.79E+02	4.65E+01
G	Waste	METALS	Vanadium	mg/kg dw	4	4	100%	4	0.78	0.78	Normal	3.20E+01	3.58E+01	4.00E+01	4.09E+01	4.26E+01	4.09E+01	4.00E+01
G	Waste	METALS	Zinc	mg/kg dw	4	4	100%	4	0.86	0.88	Lognormal	5.60E+01	6.09E+01	6.95E+01	6.79E+01	NC	NC	6.95E+01

TABLE
SAMPLES USED IN CALCULATION OF SITE CONCENTRATIONS
G Waste

Area	Medium	Sample	Date Collected	Beginning Depth (ft)	Ending Depth (ft)
G	Waste	WASTE-G-B1-0-0.5FT	10/6/99	0	0.5
G	Waste	WASTE-G-B2-0-0.5FT	10/6/99	0	0.5
G	Waste	WASTE-G-B3-0-0.5FT	10/7/99	0	0.5
G	Waste	WASTE-G-B4-0-0.5FT	10/7/99	0	0.5

* - multiple depths averaged together

Table
Site Concentration Selection
T7 Surface Soil

Area	Medium	Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for Statistics	Shapiro-Wilke's Test for Normality(a): Normal	Lognormal	Dataset Distribution	Summary Statistics: Minimum	Mean	Maximum	95% Upper Confidence Limit: t-Test	H-Test	UCL (b)	Site Concentration (c)
T7	Surface Soil	8280A	1998 Total TEQ w/ EMPC as ND	ug/kg dw	3	3	100%	3	0.95	1.00	Lognormal	9.34E-04	2.80E-03	5.23E-03	6.51E-03	2.99E+00	2.99E+00	5.23E-03
T7	Surface Soil	VOA	2-Butanone (MEK)	ug/kg dw	9	3	33%	9	0.8390	0.9556	Lognormal	9.10E+00	1.84E+01	3.70E+01	2.33E+01	2.48E+01	2.48E+01	2.48E+01
T7	Surface Soil	SVOA	2-Methylnaphthalene	ug/kg dw	9	1	11%	1	NC	NC	NC	6.50E+01	6.50E+01	6.50E+01	NC	NC	NC	6.50E+01
T7	Surface Soil	PEST	4,4'-DDD	ug/kg dw	9	1	11%	1	NC	NC	NC	1.30E+00	1.30E+00	1.30E+00	NC	NC	NC	1.30E+00
T7	Surface Soil	PEST	4,4'-DDE	ug/kg dw	9	7	78%	9	0.58	0.82	Lognormal	3.00E-01	9.60E+00	5.40E+01	2.11E+01	1.39E+02	1.39E+02	5.40E+01
T7	Surface Soil	PEST	4,4'-DDT	ug/kg dw	9	6	67%	9	0.71	0.78	Lognormal	1.10E+00	7.71E+00	2.90E+01	1.39E+01	5.00E+01	5.00E+01	2.90E+01
T7	Surface Soil	SVOA	Acenaphthene	ug/kg dw	9	2	22%	9	0.7850	0.8415	Lognormal	5.90E+01	9.77E+01	1.60E+02	1.14E+02	1.17E+02	1.17E+02	1.17E+02
T7	Surface Soil	VOA	Acetone	ug/kg dw	9	5	56%	9	0.7742	0.8661	Lognormal	2.50E+01	1.65E+02	5.00E+02	3.09E+02	1.13E+03	1.13E+03	5.00E+02
T7	Surface Soil	PEST	Alpha Chlordane	ug/kg dw	9	2	22%	9	0.59	0.80	Lognormal	3.00E-01	2.40E+00	1.10E+01	4.55E+00	8.34E+00	8.34E+00	8.34E+00
T7	Surface Soil	METALS	Aluminum	mg/kg dw	9	9	100%	9	0.82	0.86	Lognormal	6.90E+03	8.33E+03	1.20E+04	9.40E+03	9.49E+03	9.49E+03	9.49E+03
T7	Surface Soil	SVOA	Anthracene	ug/kg dw	9	3	33%	9	0.56	0.75	Lognormal	4.10E+01	1.18E+02	3.60E+02	1.76E+02	1.88E+02	1.88E+02	1.88E+02
T7	Surface Soil	METALS	Antimony	mg/kg dw	9	1	11%	2	1.00	1.00	Lognormal	3.15E-01	5.23E-01	7.30E-01	1.83E+00	NC	NC	7.30E-01
T7	Surface Soil	METALS	Arsenic	mg/kg dw	9	9	100%	9	0.45	0.53	Lognormal	6.20E+00	9.99E+00	3.40E+01	1.56E+01	1.50E+01	1.50E+01	1.50E+01
T7	Surface Soil	METALS	Barium	mg/kg dw	9	9	100%	9	0.95	0.95	Normal	1.30E+02	1.67E+02	2.00E+02	1.82E+02	1.84E+02	1.82E+02	1.82E+02
T7	Surface Soil	VOA	Benzene	ug/kg dw	9	2	22%	9	0.8935	0.9341	Lognormal	2.10E+00	3.14E+00	4.80E+00	3.68E+00	3.79E+00	3.79E+00	3.79E+00
T7	Surface Soil	SVOA	Benzo(a)anthracene	ug/kg dw	9	9	100%	9	0.5822	0.8216	Lognormal	3.60E+01	3.42E+02	1.90E+03	7.19E+02	2.73E+03	2.73E+03	1.90E+03
T7	Surface Soil	SVOA	Benzo(a)pyrene	ug/kg dw	9	9	100%	9	0.5690	0.8303	Lognormal	4.40E+01	3.74E+02	2.10E+03	7.89E+02	2.43E+03	2.43E+03	2.10E+03
T7	Surface Soil	SVOA	Benzo(b)fluoranthene	ug/kg dw	9	9	100%	9	0.5897	0.8663	Lognormal	4.00E+01	4.06E+02	2.20E+03	8.39E+02	2.83E+03	2.83E+03	2.20E+03
T7	Surface Soil	SVOA	Benzo(g,h,i)perylene	ug/kg dw	9	9	100%	9	0.61	0.86	Lognormal	4.00E+01	2.29E+02	1.10E+03	4.41E+02	8.65E+02	8.65E+02	8.65E+02
T7	Surface Soil	SVOA	Benzo(k)fluoranthene	ug/kg dw	9	9	100%	9	0.5485	0.8079	Lognormal	3.70E+01	3.54E+02	2.10E+03	7.71E+02	2.73E+03	2.73E+03	2.10E+03
T7	Surface Soil	METALS	Beryllium	mg/kg dw	9	3	33%	9	0.79	0.86	Lognormal	2.85E-01	4.23E-01	8.25E-01	5.35E-01	5.57E-01	5.57E-01	5.57E-01
T7	Surface Soil	SVOA	bis(2-Ethylhexyl)phthalate	ug/kg dw	9	4	44%	6	0.85	0.86	Lognormal	4.20E+01	7.18E+01	9.10E+01	8.95E+01	1.02E+02	1.02E+02	9.10E+01
T7	Surface Soil	SVOA	Butylbenzylphthalate	ug/kg dw	9	1	11%	1	NC	NC	NC	5.80E+01	5.80E+01	5.80E+01	NC	NC	NC	5.80E+01
T7	Surface Soil	METALS	Cadmium	mg/kg dw	9	9	100%	9	0.88	0.93	Lognormal	1.50E+00	3.12E+00	6.10E+00	4.16E+00	4.86E+00	4.86E+00	4.86E+00
T7	Surface Soil	METALS	Calcium	mg/kg dw	9	9	100%	9	0.79	0.88	Lognormal	5.95E+03	1.46E+04	3.80E+04	2.14E+04	2.66E+04	2.66E+04	2.66E+04
T7	Surface Soil	SVOA	Carbazole	ug/kg dw	9	3	33%	9	0.5714	0.7358	Lognormal	5.80E+01	1.18E+02	3.10E+02	1.62E+02	1.63E+02	1.63E+02	1.63E+02
T7	Surface Soil	VOA	Carbon disulfide	ug/kg dw	9	2	22%	9	0.8355	0.8561	Lognormal	2.50E+00	3.17E+00	4.30E+00	3.60E+00	3.66E+00	3.66E+00	3.66E+00
T7	Surface Soil	METALS	Chromium	mg/kg dw	9	9	100%	9	0.95	0.97	Lognormal	1.20E+01	1.53E+01	2.00E+01	1.69E+01	1.71E+01	1.71E+01	1.71E+01
T7	Surface Soil	SVOA	Chrysene	ug/kg dw	9	9	100%	9	0.6026	0.8437	Lognormal	4.80E+01	4.86E+02	2.60E+03	1.00E+03	3.88E+03	3.88E+03	2.60E+03
T7	Surface Soil	METALS	Cobalt	mg/kg dw	9	9	100%	9	0.87	0.88	Lognormal	6.00E+00	6.63E+00	7.60E+00	7.03E+00	NC	NC	7.60E+00
T7	Surface Soil	METALS	Copper	mg/kg dw	9	9	100%	9	0.63	0.81	Lognormal	2.10E+01	4.29E+01	1.30E+02	6.42E+01	6.76E+01	6.76E+01	6.76E+01
T7	Surface Soil	PEST	delta-BHC	ug/kg dw	9	1	11%	1	NC	NC	NC	1.80E-01	1.80E-01	1.80E-01	NC	NC	NC	1.80E-01
T7	Surface Soil	SVOA	Dibenzo(a,h)anthracene	ug/kg dw	9	3	33%	9	0.5482	0.6984	Lognormal	4.75E+01	1.03E+02	4.10E+02	1.76E+02	1.95E+02	1.95E+02	1.95E+02
T7	Surface Soil	SVOA	Dibenzofuran	ug/kg dw	9	1	11%	1	NC	NC	NC	5.20E+01	5.20E+01	5.20E+01	NC	NC	NC	5.20E+01
T7	Surface Soil	HERB	Dicamba	ug/kg dw	9	1	11%	1	NC	NC	NC	2.65E+00	2.65E+00	2.65E+00	NC	NC	NC	2.65E+00
T7	Surface Soil	PEST	Dieldrin	ug/kg dw	9	2	22%	9	0.80	0.60	Normal	2.70E-01	1.81E+00	3.00E+00	2.24E+00	3.77E+00	2.24E+00	2.24E+00
T7	Surface Soil	SVOA	Di-n-butylphthalate	ug/kg dw	9	7	78%	9	0.8849	0.9255	Lognormal	4.00E+01	8.86E+01	1.70E+02	1.12E+02	1.26E+02	1.26E+02	1.26E+02
T7	Surface Soil	PEST	Endosulfan II	ug/kg dw	9	1	11%	1	NC	NC	NC	1.00E+00	1.00E+00	1.00E+00	NC	NC	NC	1.00E+00
T7	Surface Soil	PEST	Endrin	ug/kg dw	9	2	22%	2	1.00	1.00	Lognormal	1.00E-01	2.50E-01	4.00E-01	1.20E+00	NC	NC	4.00E-01
T7	Surface Soil	PEST	Endrin ketone	ug/kg dw	9	4	44%	8	0.68	0.63	Normal	1.70E-01	1.40E+00	1.90E+00	1.89E+00	6.60E+00	1.89E+00	1.89E+00
T7	Surface Soil	VOA	Ethylbenzene	ug/kg dw	9	1	11%	6	0.9842	0.9834	Normal	2.50E+00	2.75E+00	3.00E+00	2.90E+00	NC	2.90E+00	2.90E+00
T7	Surface Soil	SVOA	Fluoranthene	ug/kg dw	9	9	100%	9	0.5713	0.8049	Lognormal	8.40E+01	9.68E+02	5.60E+03	2.08E+03	1.07E+04	1.07E+04	5.60E+03
T7	Surface Soil	SVOA	Fluorene	ug/kg dw	9	2	22%	9	0.8548	0.8430	Normal	5.60E+01	9.51E+01	1.40E+02	1.09E+02	1.13E+02	1.09E+02	1.09E+02
T7	Surface Soil	PEST	Gamma Chlordane	ug/kg dw	9	4	44%	9	0.53	0.83	Lognormal	1.00E-01	1.97E+00	1.00E+01	3.87E+00	1.00E+01	1.00E+01	1.00E+01
T7	Surface Soil	PEST	gamma-BHC (Lindane)	ug/kg dw	9	1	11%	1	NC	NC	NC	8.70E-02	8.70E-02	8.70E-02	NC	NC	NC	8.70E-02
T7	Surface Soil	PEST	Heptachlor epoxide	ug/kg dw	9	2	22%	2	1.00	1.00	Lognormal	2.60E-01	4.40E-01	6.20E-01	1.58E+00	NC	NC	6.20E-01
T7	Surface Soil	SVOA	Indeno(1,2,3-cd)pyrene	ug/kg dw	9	4	44%	9	0.57	0.83	Lognormal	5.20E+01	2.40E+02	1.10E+03	4.45E+02	6.21E+02	6.21E+02	6.21E+02
T7	Surface Soil	METALS	Iron	mg/kg dw	9	9	100%	9	0.87	0.89	Lognormal	1.30E+04	1.47E+04	1.75E+04	1.57E+04	1.58E+04	1.58E+04	1.58E+04
T7	Surface Soil	METALS	Lead	mg/kg dw	9	9	100%	9	0.75	0.87	Lognormal	3.60E+01	6.46E+01	1.50E+02	8.65E+01	9.23E+01	9.23E+01	9.23E+01
T7	Surface Soil	METALS	Magnesium	mg/kg dw	9	9	100%	9	0.88	0.97	Lognormal	2.80E+03	5.66E+03	1.10E+04	7.19E+03	7.73E+03	7.73E+03	7.73E+03
T7	Surface Soil	METALS	Manganese	mg/kg dw	9	9	100%	9	0.91	0.91	Normal	2.70E+02	3.45E+02	4.35E+02	3.84E+02	3.91E+02	3.84E+02	3.84E+02
T7	Surface Soil	METALS	Mercury	mg/kg dw	9	9	100%	9	0.88	0.93	Lognormal	4.40E-02	8.51E-02	1.60E-01	1.10E-01	1.24E-01	1.24E-01	1.24E-01
T7	Surface Soil	PEST	Methoxychlor	ug/kg dw	9	5	56%	9	0.86	0.77	Normal	9.80E-01	6.62E+00	1.00E+01	8.88E+00	1.61E+01	8.88E+00	8.88E+00
T7	Surface Soil	METALS	Molybdenum	mg/kg dw	9	8	89%	9	0.79	0.94	Lognormal	3.40E-01	7.93E-01	1.80E+00	1.05E+00	1.14E+00	1.14E+00	1.14E+00
T7	Surface Soil	METALS	Nickel	mg/kg dw	9	9	100%	9	0.54	0.65	Lognormal	1.50E+01	2.17E+01	5.50E+01	2.98E+01	2.91E+01	2.91E+01	2.91E+01
T7	Surface Soil	SVOA	Pentachlorophenol	ug/kg dw	9	3	33%	9	0.8508	0.8517	Lognormal	2.30E+02	2.41E+02	2.51E+02	2.46E+02	NC	NC	2.51E+02
T7	Surface Soil	SVOA	Phenanthrene	ug/kg dw	9	9	100%	9	0.5924	0.7881	Lognormal	3.70E+01	5.09E+02	2.90E+03	1.10E+03	9.82E+03	9.82E+03	2.90E+03
T7	Surface Soil	METALS	Potassium	mg/kg dw	9	9	100%	9	0.94	0.97	Lognormal	1.50E+03	2.02E+03	2.85E+03	2.29E+03	2.33E+03	2.33E+03	2.33E+03
T7	Surface Soil	SVOA	Pyrene	ug/kg dw	9	9	100%	9	0.57	0.80	Lognormal	7.20E+01	6.86E+02	3.90E+03	1.46E+03	6.09E+03	6.09E+03	3.90E+03
T7	Surface Soil	METALS	Selenium	mg/kg dw	9	6	67%	9	0.74	0.80	Lognormal	4.90E-01	6.93E-01	1.10E+00	8.42E-01	8.66E-01	8.66E-01	8.66E-01
T7	Surface Soil	METALS	Silver	mg/kg dw	9	4	44%	4	0.94	0.91	Normal	2.70E-01	3.65E-01	4.40E-01	4.48E-01	5.10E-01	4.48E-01	4.40E-01
T7	Surface Soil	METALS	Thallium	mg/kg dw	9	1	11%	9	0.68	0.74	Lognormal	4.85E-01	5.72E-01	8.50E-01	6.40E-01	6.40E-01	6.40E-01	6.40E-01
T7	Surface Soil	VOA	Toluene	ug/kg dw	9	4	44%	9	0.7303	0.8462	Lognormal	2.20E+00	4.68E+00	1.20E+01	6.79E+00	7.74E+00	7.74E+00	7.74E+00
T7	Surface Soil	PCB	Total PCBs	ug/kg dw	9	8	89%	9	0.89	0.92	Lognormal	7.50E+00	3.52E+01	9.00E+01	5.28E+01	1.05E+02	1.05E+02	9.00E+01
T7	Surface Soil	VOA	Trichloroethene	ug/kg dw	9	1	11%	3	0.9231	0.9210	Normal	2.50E+00	2.56E+00	2.60E+00	2.65E+00	NC	2.65E+00	2.60E+00
T7	Surface Soil	METALS	Vanadium	mg/kg dw	9	9	100%	9	0.87	0.89	Lognormal	2.10E+01	2.47E+01	3.25E+01	2.70E+01	2.71E+01	2.71E+01	2.71E+01
T7	Surface Soil	VOA	Xylenes, Total	ug/kg dw	9	1	11%	9	0.8533	0.8775	Lognormal	2.50E+00	3.18E+00	4.20E+00	3.59E+00	3.65E+00	3.65E+00	3.65E+00
T7	Surface Soil	METALS	Zinc	mg/kg dw	9	9	100%	9	0.84	0.91	Lognormal	150.00	383.89	870.00	543.49	697.07	697.07	697.07

B-13

TABLE
SAMPLES USED IN CALCULATION OF SITE CONCENTRATIONS
T7 Surface Soil

Area	Medium	Sample	Date Collected	Beginning Depth (ft)	Ending Depth (ft)
T7	Surface Soil	DAS-T7-S1-0-0.5FT	4/20/00	0	0.5
T7	Surface Soil	DAS-T7-S2-0-0.5FT	4/20/00	0	0.5
T7	Surface Soil	UAS-T7-S1-0-0.5FT	11/19/99	0	0.5
T7	Surface Soil	UAS-T7-S2-0-0.5FT	11/19/99	0	0.5
T7	Surface Soil	UAS-T7-S3-0-0.5FT	11/19/99	0	0.5
T7	Surface Soil	UAS-T7-S4-0-0.5FT	11/19/99	0	0.5
T7	Surface Soil	UAS-T7-S5-0-0.5FT	11/19/99	0	0.5
T7	Surface Soil	UAS-T7-S6-0-0.5FT	11/19/99	0	0.5
T7	Surface Soil	UAS-T7-S7-0-0.5FT	11/19/99	0	0.5

Table
Site Concentration Selection
T6 Surface Soil

Area	Medium	Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for Statistics	Shapiro-Wilke's Test for Normality(a): Normal	Lognormal	Dataset Distribution	Summary Statistics: Minimum	Mean	Maximum	95% Upper Confidence Limit: t-Test	H-Test	UCL (b)	Site Concentration (c)
T6	Surface Soil	8280A	1998 Total TEQ w/ EMPC as ND	ug/kg dw	4	4	100%	4	0.93	0.99	Lognormal	1.71E-03	6.37E-03	1.32E-02	1.22E-02	2.99E-01	2.99E-01	1.32E-02
T6	Surface Soil	PEST	4,4'-DDD	ug/kg dw	8	2	25%	8	0.71	0.78	Lognormal	1.80E+00	2.93E+00	6.40E+00	4.44E+00	5.55E+00	5.55E+00	5.55E+00
T6	Surface Soil	PEST	4,4'-DDE	ug/kg dw	8	6	75%	8	0.70	0.87	Lognormal	6.60E-01	5.35E+00	1.80E+01	1.00E+01	4.78E+01	4.78E+01	1.80E+01
T6	Surface Soil	PEST	4,4'-DDT	ug/kg dw	8	3	38%	8	0.59	0.69	Lognormal	1.60E+00	3.56E+01	1.40E+02	7.67E+01	3.10E+03	3.10E+03	1.40E+02
T6	Surface Soil	SVOA	Acenaphthene	ug/kg dw	8	2	25%	8	0.60	0.77	Lognormal	1.60E+01	1.26E+02	4.20E+02	2.08E+02	3.87E+02	3.87E+02	3.87E+02
T6	Surface Soil	VOA	Acetone	ug/kg dw	8	3	38%	8	0.64	0.74	Lognormal	2.65E+01	1.05E+02	4.20E+02	2.01E+02	4.48E+02	4.48E+02	4.20E+02
T6	Surface Soil	PEST	Alpha Chlordane	ug/kg dw	8	2	25%	8	0.74	0.91	Lognormal	5.00E-01	4.52E+00	1.70E+01	8.41E+00	3.53E+01	3.53E+01	1.70E+01
T6	Surface Soil	PEST	alpha BHC	ug/kg dw	8	1	13%	1	NC	NC	NC	2.20E-01	2.20E-01	2.20E-01	NC	NC	NC	2.20E-01
T6	Surface Soil	METALS	Aluminum	mg/kg dw	8	8	100%	8	0.92	0.88	Normal	5.20E+03	7.98E+03	9.70E+03	8.95E+03	9.28E+03	8.95E+03	8.95E+03
T6	Surface Soil	SVOA	Anthracene	ug/kg dw	8	3	38%	8	0.47	0.74	Lognormal	3.20E+01	2.43E+02	1.40E+03	5.57E+02	1.11E+03	1.11E+03	1.11E+03
T6	Surface Soil	METALS	Antimony	mg/kg dw	8	4	50%	4	0.94	0.84	Normal	5.90E-01	6.68E-01	7.70E-01	7.85E-01	8.20E-01	7.85E-01	7.70E-01
T6	Surface Soil	METALS	Arsenic	mg/kg dw	8	8	100%	8	0.91	0.95	Lognormal	4.00E+00	6.01E+00	9.20E+00	7.20E+00	7.52E+00	7.52E+00	7.52E+00
T6	Surface Soil	METALS	Barium	mg/kg dw	8	8	100%	8	0.92	0.92	Normal	8.90E+01	1.50E+02	2.00E+02	1.78E+02	1.90E+02	1.78E+02	1.78E+02
T6	Surface Soil	SVOA	Benzo(a)anthracene	ug/kg dw	8	7	88%	8	0.45	0.79	Lognormal	2.50E+01	6.06E+02	4.20E+03	1.58E+03	7.08E+03	7.08E+03	4.20E+03
T6	Surface Soil	SVOA	Benzo(a)pyrene	ug/kg dw	8	2	25%	8	0.43	0.55	Lognormal	4.85E+01	5.04E+02	3.60E+03	1.34E+03	4.09E+03	4.09E+03	3.60E+03
T6	Surface Soil	SVOA	Benzo(b)fluoranthene	ug/kg dw	8	7	88%	8	0.44	0.74	Lognormal	3.40E+01	6.34E+02	4.40E+03	1.65E+03	6.02E+03	6.02E+03	4.40E+03
T6	Surface Soil	SVOA	Benzo(g,h,i)perylene	ug/kg dw	8	1	13%	8	0.43	0.48	Lognormal	9.00E+01	2.46E+02	1.30E+03	5.32E+02	6.45E+02	6.45E+02	6.45E+02
T6	Surface Soil	SVOA	Benzo(k)fluoranthene	ug/kg dw	8	2	25%	8	0.43	0.55	Lognormal	5.30E+01	5.03E+02	3.40E+03	1.29E+03	2.79E+03	2.79E+03	2.79E+03
T6	Surface Soil	METALS	Beryllium	mg/kg dw	8	7	88%	8	0.91	0.87	Normal	1.70E-01	4.90E-01	6.60E-01	6.23E-01	7.67E-01	6.23E-01	6.23E-01
T6	Surface Soil	PEST	beta BHC	ug/kg dw	8	1	13%	8	0.83	0.88	Lognormal	2.80E-01	1.34E+00	3.80E+00	2.21E+00	6.26E+00	6.26E+00	3.80E+00
T6	Surface Soil	SVOA	bis(2-Ethylhexyl)phthalate	ug/kg dw	8	2	25%	8	0.60	0.77	Lognormal	2.90E+01	1.19E+02	3.60E+02	1.86E+02	2.42E+02	2.42E+02	2.42E+02
T6	Surface Soil	SVOA	Butylbenzylphthalate	ug/kg dw	8	1	13%	1	NC	NC	NC	5.70E+01	5.70E+01	5.70E+01	NC	NC	NC	5.70E+01
T6	Surface Soil	METALS	Cadmium	mg/kg dw	8	8	100%	8	0.69	0.83	Lognormal	6.10E-01	1.50E+00	4.00E+00	2.22E+00	2.48E+00	2.48E+00	2.48E+00
T6	Surface Soil	METALS	Calcium	mg/kg dw	8	8	100%	8	0.85	0.84	Normal	9.50E+03	6.26E+04	1.50E+05	1.01E+05	4.62E+05	1.01E+05	1.01E+05
T6	Surface Soil	SVOA	Carbazole	ug/kg dw	8	1	13%	8	0.43	0.47	Lognormal	9.00E+01	1.91E+02	6.60E+02	3.72E+02	4.06E+02	4.06E+02	4.06E+02
T6	Surface Soil	METALS	Chromium	mg/kg dw	8	8	100%	8	0.81	0.83	Lognormal	1.30E+01	1.44E+01	1.80E+01	1.55E+01	1.56E+01	1.56E+01	1.56E+01
T6	Surface Soil	SVOA	Chrysene	ug/kg dw	8	7	88%	8	0.45	0.79	Lognormal	3.00E+01	7.12E+02	4.90E+03	1.85E+03	8.00E+03	8.00E+03	4.90E+03
T6	Surface Soil	METALS	Cobalt	mg/kg dw	8	8	100%	8	0.88	0.90	Lognormal	3.90E+00	5.98E+00	9.20E+00	7.07E+00	7.41E+00	7.41E+00	7.41E+00
T6	Surface Soil	METALS	Copper	mg/kg dw	8	8	100%	8	0.85	0.93	Lognormal	1.60E+01	2.93E+01	5.60E+01	3.76E+01	4.02E+01	4.02E+01	4.02E+01
T6	Surface Soil	PEST	delta-BHC	ug/kg dw	8	1	13%	1	NC	NC	NC	1.20E-01	1.20E-01	1.20E-01	NC	NC	NC	1.20E-01
T6	Surface Soil	SVOA	Dibenzo(a,h)anthracene	ug/kg dw	8	3	38%	8	0.47	0.66	Lognormal	2.60E+01	1.18E+02	6.00E+02	2.49E+02	3.30E+02	3.30E+02	3.30E+02
T6	Surface Soil	SVOA	Dibenzofuran	ug/kg dw	8	1	13%	8	0.49	0.53	Lognormal	9.00E+01	1.12E+02	2.30E+02	1.44E+02	1.43E+02	1.43E+02	1.43E+02
T6	Surface Soil	HERB	Dicamba	ug/kg dw	8	2	25%	2	1.00	1.00	Lognormal	1.70E+00	2.35E+00	3.00E+00	6.45E+00	NC	NC	3.00E+00
T6	Surface Soil	PEST	Dieldrin	ug/kg dw	8	1	13%	1	NC	NC	NC	1.80E+00	1.80E+00	1.80E+00	NC	NC	NC	1.80E+00
T6	Surface Soil	PEST	Endosulfan sulfate	ug/kg dw	8	3	38%	3	0.95	0.99	Lognormal	5.70E-01	1.14E+00	1.90E+00	2.30E+00	3.48E+01	3.48E+01	1.90E+00
T6	Surface Soil	PEST	Endrin	ug/kg dw	8	1	13%	4	0.87	0.88	Lognormal	1.85E+00	1.99E+00	2.20E+00	2.16E+00	NC	NC	2.20E+00
T6	Surface Soil	PEST	Endrin aldehyde	ug/kg dw	8	1	13%	1	NC	NC	NC	7.50E-01	7.50E-01	7.50E-01	NC	NC	NC	7.50E-01
T6	Surface Soil	PEST	Endrin ketone	ug/kg dw	8	2	25%	2	1.00	1.00	Lognormal	2.30E-01	4.50E-01	6.70E-01	1.84E+00	NC	NC	6.70E-01
T6	Surface Soil	SVOA	Fluoranthene	ug/kg dw	8	7	88%	8	0.45	0.81	Lognormal	4.20E+01	1.38E+03	9.80E+03	3.66E+03	2.45E+04	2.45E+04	9.80E+03
T6	Surface Soil	SVOA	Fluorene	ug/kg dw	8	1	13%	8	0.44	0.48	Lognormal	9.00E+01	1.56E+02	5.80E+02	2.71E+02	2.78E+02	2.78E+02	2.78E+02
T6	Surface Soil	PEST	Gamma Chlordane	ug/kg dw	8	2	25%	8	0.71	0.82	Lognormal	9.40E-01	4.70E+00	1.80E+01	8.77E+00	2.82E+01	2.82E+01	1.80E+01
T6	Surface Soil	PEST	gamma BHC (Lindane)	ug/kg dw	8	1	13%	1	NC	NC	NC	1.30E-01	1.30E-01	1.30E-01	NC	NC	NC	1.30E-01
T6	Surface Soil	PEST	Heptachlor	ug/kg dw	8	1	13%	5	0.72	0.79	Lognormal	9.50E-01	1.78E+00	4.10E+00	3.07E+00	5.30E+00	5.30E+00	4.10E+00
T6	Surface Soil	PEST	Heptachlor epoxide	ug/kg dw	8	1	13%	1	NC	NC	NC	1.80E-01	1.80E-01	1.80E-01	NC	NC	NC	1.80E-01
T6	Surface Soil	SVOA	Indeno(1,2,3-cd)pyrene	ug/kg dw	8	4	50%	8	0.47	0.65	Lognormal	5.10E+01	2.20E+02	1.10E+03	4.58E+02	5.88E+02	5.88E+02	5.88E+02
T6	Surface Soil	METALS	Iron	mg/kg dw	8	8	100%	8	0.88	0.87	Normal	9.00E+03	1.36E+04	1.90E+04	1.57E+04	1.63E+04	1.57E+04	1.57E+04
T6	Surface Soil	METALS	Lead	mg/kg dw	8	8	100%	8	0.81	0.84	Lognormal	2.90E+01	5.64E+01	1.10E+02	7.65E+01	9.21E+01	9.21E+01	9.21E+01
T6	Surface Soil	METALS	Magnesium	mg/kg dw	8	8	100%	8	0.83	0.87	Lognormal	4.90E+03	8.71E+03	1.80E+04	1.18E+04	1.35E+04	1.35E+04	1.35E+04
T6	Surface Soil	METALS	Manganese	mg/kg dw	8	8	100%	8	0.73	0.83	Lognormal	2.80E+02	3.85E+02	6.60E+02	4.64E+02	4.69E+02	4.69E+02	4.69E+02
T6	Surface Soil	HERB	MCPP	ug/kg dw	8	1	13%	8	0.45	0.50	Lognormal	1.05E+03	1.55E+03	4.50E+03	2.35E+03	2.35E+03	2.35E+03	2.35E+03
T6	Surface Soil	METALS	Mercury	mg/kg dw	8	8	100%	8	0.88	0.88	Lognormal	3.90E-02	5.73E-02	8.80E-02	6.93E-02	7.28E-02	7.28E-02	7.28E-02
T6	Surface Soil	PEST	Methoxychlor	ug/kg dw	8	3	38%	3	0.99	0.94	Normal	1.50E+00	3.60E+00	5.50E+00	6.98E+00	2.45E+02	6.98E+00	5.50E+00
T6	Surface Soil	METALS	Molybdenum	mg/kg dw	8	8	100%	8	0.58	0.83	Lognormal	2.80E-01	8.40E-01	3.20E+00	1.49E+00	1.84E+00	1.84E+00	1.84E+00
T6	Surface Soil	METALS	Nickel	mg/kg dw	8	8	100%	8	0.93	0.96	Lognormal	1.30E+01	1.73E+01	2.30E+01	1.93E+01	1.96E+01	1.96E+01	1.96E+01
T6	Surface Soil	SVOA	Pentachlorophenol	ug/kg dw	8	5	63%	7	0.90	0.90	Lognormal	2.31E+02	2.40E+02	2.49E+02	2.45E+02	NC	NC	2.49E+02
T6	Surface Soil	SVOA	Phenanthrene	ug/kg dw	8	6	75%	8	0.44	0.74	Lognormal	2.80E+01	9.75E+02	7.10E+03	2.63E+03	1.62E+04	1.62E+04	7.10E+03
T6	Surface Soil	METALS	Potassium	mg/kg dw	8	8	100%	8	0.94	0.97	Lognormal	1.30E+03	1.78E+03	2.40E+03	1.99E+03	2.03E+03	2.03E+03	2.03E+03
T6	Surface Soil	SVOA	Pyrene	ug/kg dw	8	6	75%	8	0.44	0.68	Lognormal	9.70E+01	1.11E+03	7.70E+03	2.89E+03	1.02E+04	1.02E+04	7.70E+03
T6	Surface Soil	METALS	Selenium	mg/kg dw	8	1	13%	8	0.79	0.81	Lognormal	5.00E-01	5.66E-01	6.80E-01	6.02E-01	NC	NC	6.80E-01
T6	Surface Soil	METALS	Silver	mg/kg dw	8	1	13%	1	NC	NC	NC	2.90E-01	2.90E-01	2.90E-01	NC	NC	NC	2.90E-01
T6	Surface Soil	METALS	Thallium	mg/kg dw	8	2	25%	8	0.67	0.71	Lognormal	5.00E-01	6.19E-01	9.70E-01	7.24E-01	7.30E-01	7.30E-01	7.30E-01
T6	Surface Soil	VOA	Toluene	ug/kg dw	8	1	13%	1	NC	NC	NC	2.20E+00	2.20E+00	2.20E+00	NC	NC	NC	2.20E+00
T6	Surface Soil	PCB	Total PCBs	ug/kg dw	8	6	75%	8	0.64	0.83	Lognormal	9.00E+00	8.31E+01	3.85E+02	1.73E+02	1.02E+03	1.02E+03	3.85E+02
T6	Surface Soil	METALS	Vanadium	mg/kg dw	8	8	100%	8	0.95	0.95	Normal	1.70E+01	2.54E+01	3.30E+01	2.89E+01	2.99E+01	2.89E+01	2.89E+01
T6	Surface Soil	METALS	Zinc	mg/kg dw	8	8	100%	8	0.80	0.89	Lognormal	8.20E+01	1.56E+02	3.50E+02	2.19E+02	2.50E+02	2.50E+02	2.50E+02

TABLE
SAMPLES USED IN CALCULATION OF SITE CONCENTRATIONS
T6 Surface Soil

Area	Medium	Sample	Date Collected	Beginning Depth (ft)	Ending Depth (ft)
T6	Surface Soil	DAS-T6-S1-0-0.5FT	4/20/00	0	0.5
T6	Surface Soil	DAS-T6-S2-0-0.5FT	4/20/00	0	0.5
T6	Surface Soil	DAS-T6-S3-0-0.5FT	4/20/00	0	0.5
T6	Surface Soil	UAS-T6-S1-0-0.5FT	11/18/99	0	0.5
T6	Surface Soil	UAS-T6-S2-0-0.5FT	11/18/99	0	0.5
T6	Surface Soil	UAS-T6-S3-0-0.5FT	11/18/99	0	0.5
T6	Surface Soil	UAS-T6-S4-0-0.5FT	11/18/99	0	0.5
T6	Surface Soil	UAS-T6-S5-0-0.5FT	11/18/99	0	0.5

Table
Site Concentration Selection
T5 Surface Soil

Area	Medium	Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for Statistics	Shapiro-Wilke's Test for Normality(a)			Summary Statistics			95% Upper Confidence Limit			Site Concentration (c)
									Normal	Lognormal	Dataset Distribution	Minimum	Mean	Maximum	t-Test	H-Test	UCL (b)	
T5	Surface Soil	8280A	1998 Total TEQ w/ EMPC as ND	ug/kg dw	4	4	100%	4	0.70	0.81	Lognormal	2.48E-03	7.87E-03	2.18E-02	1.88E-02	1.37E+00	1.37E+00	2.18E-02
T5	Surface Soil	HERB	2,4-DB	ug/kg dw	9	2	22%	9	0.59	0.61	Lognormal	4.30E+00	8.15E+00	2.30E+01	1.26E+01	1.45E+01	1.45E+01	1.45E+01
T5	Surface Soil	VOA	2-Butanone (MEK)	ug/kg dw	9	5	56%	9	0.79	0.84	Lognormal	1.30E+01	1.83E+01	3.40E+01	2.27E+01	2.34E+01	2.34E+01	2.34E+01
T5	Surface Soil	PEST	4,4'-DDD	ug/kg dw	9	1	11%	9	0.53	0.69	Lognormal	1.70E+00	6.73E+00	3.60E+01	1.37E+01	2.14E+01	2.14E+01	2.14E+01
T5	Surface Soil	PEST	4,4'-DDE	ug/kg dw	9	3	33%	9	0.70	0.75	Lognormal	1.70E+00	3.15E+00	8.30E+00	4.58E+00	5.21E+00	5.21E+00	5.21E+00
T5	Surface Soil	PEST	4,4'-DDT	ug/kg dw	9	3	33%	9	0.50	0.68	Lognormal	1.70E+00	1.87E+01	1.10E+02	3.88E+01	1.43E+02	1.43E+02	1.10E+02
T5	Surface Soil	SVOA	Acenaphthylene	ug/kg dw	9	1	11%	1	NC	NC	NC	3.40E+01	3.40E+01	3.40E+01	NC	NC	NC	3.40E+01
T5	Surface Soil	VOA	Acetone	ug/kg dw	9	5	56%	9	0.78	0.81	Lognormal	2.60E+01	1.37E+02	4.60E+02	2.24E+02	6.42E+02	6.42E+02	4.60E+02
T5	Surface Soil	PEST	Aldrin	ug/kg dw	9	1	11%	9	0.50	0.68	Lognormal	9.00E-01	3.96E+00	2.30E+01	8.46E+00	1.37E+01	1.37E+01	1.37E+01
T5	Surface Soil	PEST	Alpha Chlordane	ug/kg dw	9	3	33%	9	0.51	0.88	Lognormal	1.60E-01	8.12E+00	5.40E+01	1.89E+01	1.69E+02	1.69E+02	5.40E+01
T5	Surface Soil	METALS	Aluminum	mg/kg dw	9	9	100%	9	0.91	0.91	Normal	5.30E+03	8.37E+03	1.10E+04	9.71E+03	1.02E+04	9.71E+03	9.71E+03
T5	Surface Soil	SVOA	Anthracene	ug/kg dw	9	1	11%	1	NC	NC	NC	8.90E+01	8.90E+01	8.90E+01	NC	NC	NC	8.90E+01
T5	Surface Soil	METALS	Antimony	mg/kg dw	9	3	33%	3	0.78	0.78	Lognormal	8.20E-01	7.18E-01	9.05E-01	9.91E-01	1.21E+00	1.21E+00	9.05E-01
T5	Surface Soil	METALS	Arsenic	mg/kg dw	9	9	100%	9	0.98	0.98	Lognormal	5.40E+00	6.33E+00	7.60E+00	6.79E+00	6.83E+00	6.83E+00	6.83E+00
T5	Surface Soil	METALS	Barium	mg/kg dw	9	9	100%	9	0.89	0.88	Normal	1.50E+02	1.74E+02	1.90E+02	1.81E+02	NC	1.81E+02	1.81E+02
T5	Surface Soil	VOA	Benzene	ug/kg dw	9	1	11%	1	NC	NC	NC	1.80E+00	1.80E+00	1.80E+00	NC	NC	NC	1.80E+00
T5	Surface Soil	SVOA	Benzo(a)anthracene	ug/kg dw	9	6	67%	9	0.55	0.80	Lognormal	3.60E+01	1.21E+02	4.60E+02	2.01E+02	2.27E+02	2.27E+02	2.27E+02
T5	Surface Soil	SVOA	Benzo(a)pyrene	ug/kg dw	9	4	44%	9	0.58	0.72	Lognormal	4.70E+01	1.38E+02	8.00E+02	2.52E+02	3.37E+02	3.37E+02	3.37E+02
T5	Surface Soil	SVOA	Benzo(b)fluoranthene	ug/kg dw	9	6	67%	9	0.50	0.68	Lognormal	7.00E+01	1.78E+02	7.80E+02	3.19E+02	3.32E+02	3.32E+02	3.32E+02
T5	Surface Soil	SVOA	Benzo(g,h,i)perylene	ug/kg dw	9	4	44%	9	0.67	0.81	Lognormal	4.40E+01	1.56E+02	4.30E+02	2.44E+02	3.17E+02	3.17E+02	3.17E+02
T5	Surface Soil	SVOA	Benzo(k)fluoranthene	ug/kg dw	9	4	44%	9	0.58	0.77	Lognormal	5.80E+01	1.59E+02	8.00E+02	2.84E+02	2.84E+02	2.84E+02	2.84E+02
T5	Surface Soil	METALS	Beryllium	mg/kg dw	9	9	100%	9	0.98	0.97	Normal	4.00E-01	5.29E-01	6.60E-01	5.81E-01	5.89E-01	5.81E-01	5.81E-01
T5	Surface Soil	PEST	beta BHC	ug/kg dw	9	1	11%	1	NC	NC	NC	1.00E-01	1.00E-01	1.00E-01	NC	NC	NC	1.00E-01
T5	Surface Soil	SVOA	bis(2-Ethylhexyl)phthalate	ug/kg dw	9	4	44%	9	0.82	0.88	Lognormal	5.30E+01	1.06E+02	1.80E+02	1.30E+02	1.39E+02	1.39E+02	1.39E+02
T5	Surface Soil	SVOA	Butylbenzylphthalate	ug/kg dw	9	1	11%	9	0.43	0.48	Lognormal	9.00E+01	1.22E+02	3.40E+02	1.72E+02	1.68E+02	1.68E+02	1.68E+02
T5	Surface Soil	METALS	Cadmium	mg/kg dw	9	9	100%	9	0.74	0.87	Lognormal	1.40E+00	3.42E+00	8.40E+00	4.78E+00	5.34E+00	5.34E+00	5.34E+00
T5	Surface Soil	METALS	Calcium	mg/kg dw	9	9	100%	9	0.87	0.87	Lognormal	3.80E+03	9.93E+03	2.05E+04	1.38E+04	1.90E+04	1.90E+04	1.90E+04
T5	Surface Soil	SVOA	Carbazole	ug/kg dw	9	1	11%	1	NC	NC	NC	7.10E+01	7.10E+01	7.10E+01	NC	NC	NC	7.10E+01
T5	Surface Soil	METALS	Chromium	mg/kg dw	9	9	100%	9	0.98	0.98	Normal	1.10E+01	1.46E+01	1.85E+01	1.61E+01	1.63E+01	1.61E+01	1.61E+01
T5	Surface Soil	SVOA	Chrysene	ug/kg dw	9	6	67%	9	0.55	0.84	Lognormal	4.90E+01	1.70E+02	7.10E+02	2.97E+02	3.35E+02	3.35E+02	3.35E+02
T5	Surface Soil	METALS	Cobalt	mg/kg dw	9	9	100%	9	0.96	0.95	Normal	5.20E+00	5.99E+00	6.90E+00	6.31E+00	NC	6.31E+00	6.31E+00
T5	Surface Soil	METALS	Copper	mg/kg dw	9	9	100%	9	0.83	0.85	Lognormal	3.80E+01	5.42E+01	8.45E+01	6.51E+01	6.78E+01	6.78E+01	6.78E+01
T5	Surface Soil	SVOA	Dibenzo(a,h)anthracene	ug/kg dw	9	4	44%	9	0.65	0.73	Lognormal	4.65E+01	9.88E+01	3.20E+02	1.55E+02	1.85E+02	1.85E+02	1.85E+02
T5	Surface Soil	HERB	Dicamba	ug/kg dw	9	2	22%	2	1.00	1.00	Lognormal	1.30E+00	2.10E+00	2.90E+00	7.15E+00	NC	NC	2.90E+00
T5	Surface Soil	PEST	Dieldrin	ug/kg dw	9	2	22%	9	0.43	0.61	Lognormal	1.40E+00	1.58E+01	1.20E+02	4.01E+01	9.51E+01	9.51E+01	9.51E+01
T5	Surface Soil	SVOA	Diethylphthalate	ug/kg dw	9	1	11%	1	NC	NC	NC	3.90E+01	3.90E+01	3.00E+01	NC	NC	NC	3.90E+01
T5	Surface Soil	SVOA	Di-n-butylphthalate	ug/kg dw	9	2	22%	2	1.00	1.00	Normal	3.20E+01	3.35E+01	3.50E+01	4.30E+01	NC	4.30E+01	3.50E+01
T5	Surface Soil	PEST	Endrin	ug/kg dw	9	1	11%	8	0.64	0.68	Lognormal	1.70E+00	2.62E+00	6.10E+00	3.68E+00	3.96E+00	3.96E+00	3.96E+00
T5	Surface Soil	PEST	Endrin aldehyde	ug/kg dw	9	2	22%	8	0.85	0.79	Normal	2.40E-01	2.29E+00	5.06E+00	3.29E+00	8.10E+00	3.29E+00	3.29E+00
T5	Surface Soil	PEST	Endrin ketone	ug/kg dw	9	1	11%	8	0.66	0.68	Lognormal	1.70E+00	2.47E+00	4.95E+00	3.30E+00	3.51E+00	3.51E+00	3.51E+00
T5	Surface Soil	SVOA	Fluoranthene	ug/kg dw	9	5	56%	9	0.53	0.74	Lognormal	9.00E+01	2.43E+02	1.10E+03	4.46E+02	5.15E+02	5.15E+02	5.15E+02
T5	Surface Soil	PEST	Gamma Chlordane	ug/kg dw	9	2	22%	9	0.57	0.66	Lognormal	9.00E-01	1.77E+01	7.80E+01	3.77E+01	7.83E+02	7.83E+02	7.80E+01
T5	Surface Soil	PEST	Heptachlor	ug/kg dw	9	1	11%	9	0.42	0.62	Lognormal	9.00E-01	1.15E+01	9.10E+01	3.00E+01	8.13E+01	8.13E+01	8.13E+01
T5	Surface Soil	PEST	Heptachlor epoxide	ug/kg dw	9	2	22%	9	0.53	0.89	Lognormal	9.10E-02	4.94E+00	3.00E+01	1.09E+01	8.51E+01	8.51E+01	3.00E+01
T5	Surface Soil	SVOA	Indeno(1,2,3-cd)pyrene	ug/kg dw	9	5	56%	9	0.70	0.76	Lognormal	7.90E+01	1.71E+02	4.50E+02	2.56E+02	3.08E+02	3.08E+02	3.08E+02
T5	Surface Soil	METALS	Iron	mg/kg dw	9	9	100%	9	0.91	0.91	Lognormal	1.20E+04	1.39E+04	1.60E+04	1.48E+04	NC	NC	1.60E+04
T5	Surface Soil	METALS	Lead	mg/kg dw	9	9	100%	9	0.79	0.86	Lognormal	3.50E+01	8.03E+01	1.70E+02	1.11E+02	1.31E+02	1.31E+02	1.31E+02
T5	Surface Soil	METALS	Magnesium	mg/kg dw	9	9	100%	9	0.93	0.92	Normal	3.00E+03	4.13E+03	5.00E+03	4.56E+03	4.65E+03	4.56E+03	4.56E+03
T5	Surface Soil	METALS	Manganese	mg/kg dw	9	9	100%	9	0.89	0.87	Normal	2.80E+02	3.48E+02	4.00E+02	3.75E+02	3.80E+02	3.75E+02	3.75E+02
T5	Surface Soil	HERB	MCPA	ug/kg dw	9	2	22%	9	0.55	0.64	Lognormal	1.05E+03	1.58E+03	4.40E+03	2.26E+03	2.28E+03	2.28E+03	2.28E+03
T5	Surface Soil	HERB	MCPP	ug/kg dw	9	6	67%	9	0.87	0.92	Lognormal	1.10E+03	2.95E+03	6.80E+03	4.18E+03	5.59E+03	5.59E+03	5.59E+03
T5	Surface Soil	METALS	Mercury	mg/kg dw	9	9	100%	9	0.87	0.92	Lognormal	4.40E-02	6.97E-02	1.15E-01	8.49E-02	8.91E-02	8.91E-02	8.91E-02
T5	Surface Soil	PEST	Methoxychlor	ug/kg dw	9	3	33%	9	0.84	0.85	Lognormal	1.30E+00	1.47E+01	3.80E+01	2.16E+01	4.99E+01	4.99E+01	3.80E+01
T5	Surface Soil	METALS	Molybdenum	mg/kg dw	9	9	100%	9	0.96	0.97	Lognormal	2.20E-01	4.84E-01	7.80E-01	5.70E-01	6.44E-01	6.44E-01	6.44E-01
T5	Surface Soil	METALS	Nickel	mg/kg dw	9	9	100%	9	0.95	0.95	Normal	1.40E+01	1.88E+01	1.80E+01	1.79E+01	1.80E+01	1.79E+01	1.79E+01
T5	Surface Soil	SVOA	Pentachlorophenol	ug/kg dw	9	3	33%	5	0.89	0.89	Normal	2.25E+02	2.34E+02	2.41E+02	2.40E+02	NC	2.40E+02	2.40E+02
T5	Surface Soil	SVOA	Phenanthrene	ug/kg dw	9	6	67%	9	0.65	0.88	Lognormal	2.20E+01	1.01E+02	3.60E+02	1.64E+02	2.49E+02	2.49E+02	2.49E+02
T5	Surface Soil	METALS	Potassium	mg/kg dw	9	9	100%	9	0.83	0.87	Lognormal	1.50E+03	1.76E+03	2.40E+03	1.93E+03	1.94E+03	1.94E+03	1.94E+03
T5	Surface Soil	SVOA	Pyrene	ug/kg dw	9	5	56%	9	0.55	0.76	Lognormal	7.70E+01	1.99E+02	8.10E+02	3.44E+02	3.78E+02	3.78E+02	3.78E+02
T5	Surface Soil	METALS	Selenium	mg/kg dw	9	1	11%	1	NC	NC	NC	4.80E-01	4.80E-01	4.80E-01	NC	NC	NC	4.80E-01
T5	Surface Soil	METALS	Silver	mg/kg dw	9	3	33%	9	0.65	0.57	Normal	2.10E-01	5.01E-01	8.00E-01	5.71E-01	6.40E-01	5.71E-01	5.71E-01
T5	Surface Soil	VOA	Toluene	ug/kg dw	9	1	11%	7	0.89	0.89	Lognormal	2.60E+00	2.70E+00	2.80E+00	2.76E+00	NC	NC	2.80E+00
T5	Surface Soil	PCB	Total PCBs	ug/kg dw	9	7	78%	9	0.90	0.92	Lognormal	1.00E+01	6.67E+01	1.65E+02	1.01E+02	2.81E+02	2.81E+02	1.65E+02
T5	Surface Soil	METALS	Vanadium	mg/kg dw	9	9	100%	9	0.85	0.84	Normal	1.70E+01	2.43E+01	2.90E+01	2.72E+01	2.80E+01	2.72E+01	2.72E+01
T5	Surface Soil	METALS	Zinc	mg/kg dw	9	9	100%	9	0.71	0.82	Lognormal	1.40E+02	3.74E+02	9.80E+02	5.53E+02	6.51E+02	6.51E+02	6.51E+02

B-17

TABLE
SAMPLES USED IN CALCULATION OF SITE CONCENTRATIONS
T5 Surface Soil

Area	Medium	Sample	Date Collected	Beginning Depth (ft)	Ending Depth (ft)
T5	Surface Soil	DAS-T5-S1-0-0.5FT	4/19/00	0	0.5
T5	Surface Soil	DAS-T5-S2-0-0.5FT	4/19/00	0	0.5
T5	Surface Soil	DAS-T5-S3-0-0.5FT	4/19/00	0	0.5
T5	Surface Soil	UAS-T5-S1-0-0.5FT	11/17/99	0	0.5
T5	Surface Soil	UAS-T5-S2-0-0.5FT	11/17/99	0	0.5
T5	Surface Soil	UAS-T5-S3-0-0.5FT	11/17/99	0	0.5
T5	Surface Soil	UAS-T5-S4-0-0.5FT	11/17/99	0	0.5
T5	Surface Soil	UAS-T5-S5-0-0.5FT	11/17/99	0	0.5
T5	Surface Soil	UAS-T5-S6-0-0.5FT	11/17/99	0	0.5

Table
Site Concentration Selection
T4 Surface Soil

Area	Medium	Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for Statistics	Shapiro-Wilke's Test for Normality(a): Normal	Lognormal	Dataset Distribution	Summary Statistics: Minimum	Mean	Maximum	95% Upper Confidence Limit: t-Test	H-Test	UCL (b)	Site Concentration (c)
T4	Surface Soil	8280A	1998 Total TEQ w/ EMPC as ND	ug/kg dw	5	5	100%	5	0.88	0.92	Lognormal	2.76E-03	4.71E-03	7.42E-03	6.32E-03	7.44E-03	7.44E-03	7.42E-03
T4	Surface Soil	HERB	2,4 DB	ug/kg dw	10	1	10%	10	0.39	0.45	Lognormal	4.25E+00	7.68E+00	3.50E+01	1.32E+01	1.17E+01	1.17E+01	1.17E+01
T4	Surface Soil	VOA	2 Butanone (MEK)	ug/kg dw	10	1	10%	10	0.89	0.95	Lognormal	1.00E+01	1.50E+01	2.45E+01	1.76E+01	1.80E+01	1.80E+01	1.80E+01
T4	Surface Soil	SVOA	2 Methylnaphthalene	ug/kg dw	10	2	20%	2	1.00	1.00	Lognormal	6.15E+01	6.68E+01	7.20E+01	9.99E+01	NC	NC	7.20E+01
T4	Surface Soil	PEST	4,4' DDE	ug/kg dw	10	4	40%	4	0.97	0.98	Lognormal	7.30E-01	1.08E+00	1.50E+00	1.48E+00	2.03E+00	2.03E+00	1.50E+00
T4	Surface Soil	PEST	4,4' DDT	ug/kg dw	10	5	50%	10	0.91	0.91	Lognormal	9.20E-01	1.74E+00	3.00E+00	2.08E+00	2.22E+00	2.22E+00	2.22E+00
T4	Surface Soil	SVOA	Acenaphthene	ug/kg dw	10	5	50%	10	0.46	0.72	Lognormal	5.70E+01	2.11E+02	1.20E+03	4.14E+02	4.20E+02	4.20E+02	4.20E+02
T4	Surface Soil	SVOA	Acenaphthylene	ug/kg dw	10	3	30%	3	1.00	0.98	Normal	2.40E+01	4.93E+01	7.50E+01	9.23E+01	1.11E+03	9.23E+01	7.50E+01
T4	Surface Soil	VOA	Acetone	ug/kg dw	10	2	20%	10	0.56	0.65	Lognormal	2.05E+01	9.68E+01	4.60E+02	1.86E+02	3.01E+02	3.01E+02	3.01E+02
T4	Surface Soil	PEST	Alpha Chlordane	ug/kg dw	10	4	40%	10	0.63	0.71	Lognormal	9.00E-01	1.32E+00	3.10E+00	1.73E+00	1.74E+00	1.74E+00	1.74E+00
T4	Surface Soil	METALS	Aluminum	mg/kg dw	10	10	100%	10	0.95	0.96	Lognormal	5.10E+03	9.40E+03	1.40E+04	1.09E+04	1.14E+04	1.14E+04	1.14E+04
T4	Surface Soil	SVOA	Anthracene	ug/kg dw	10	6	60%	10	0.50	0.84	Lognormal	3.00E+01	3.65E+02	2.30E+03	7.67E+02	1.24E+03	1.24E+03	1.24E+03
T4	Surface Soil	METALS	Antimony	mg/kg dw	10	1	10%	1	NC	NC	NC	6.50E-01	6.50E-01	6.50E-01	NC	NC	NC	6.50E-01
T4	Surface Soil	METALS	Arsenic	mg/kg dw	10	10	100%	10	0.97	0.95	Normal	3.40E+00	6.76E+00	1.00E+01	7.97E+00	8.51E+00	7.97E+00	7.97E+00
T4	Surface Soil	METALS	Barium	mg/kg dw	10	10	100%	10	0.48	0.75	Lognormal	7.70E+01	2.65E+02	1.20E+03	4.57E+02	4.53E+02	4.53E+02	4.53E+02
T4	Surface Soil	SVOA	Benzo(a)anthracene	ug/kg dw	10	8	80%	10	0.56	0.93	Lognormal	3.40E+01	7.03E+02	4.30E+03	1.46E+03	4.79E+03	4.79E+03	4.30E+03
T4	Surface Soil	SVOA	Benzo(a)pyrene	ug/kg dw	10	5	50%	10	0.58	0.85	Lognormal	5.00E+01	5.91E+02	3.50E+03	1.21E+03	4.73E+03	4.73E+03	3.50E+03
T4	Surface Soil	SVOA	Benzo(b)fluoranthene	ug/kg dw	10	5	50%	10	0.56	0.79	Lognormal	8.00E+01	5.98E+02	3.50E+03	1.21E+03	2.81E+03	2.81E+03	2.81E+03
T4	Surface Soil	SVOA	Benzo(g,h,i)perylene	ug/kg dw	10	4	40%	10	0.54	0.70	Lognormal	9.00E+01	3.93E+02	2.20E+03	7.75E+02	1.18E+03	1.18E+03	1.18E+03
T4	Surface Soil	SVOA	Benzo(k)fluoranthene	ug/kg dw	10	5	50%	10	0.53	0.77	Lognormal	9.00E+01	5.42E+02	3.30E+03	1.12E+03	1.94E+03	1.94E+03	1.94E+03
T4	Surface Soil	METALS	Beryllium	mg/kg dw	10	10	100%	10	0.95	0.89	Normal	2.70E-01	5.83E-01	8.60E-01	6.78E-01	7.26E-01	6.78E-01	6.78E-01
T4	Surface Soil	PEST	beta-BHC	ug/kg dw	10	4	40%	10	0.66	0.80	Lognormal	1.00E-01	4.41E-01	1.30E+00	6.58E-01	8.06E-01	8.06E-01	8.06E-01
T4	Surface Soil	SVOA	bis(2-Ethylhexyl)phthalate	ug/kg dw	10	1	10%	1	NC	NC	NC	6.60E+01	6.60E+01	6.60E+01	NC	NC	NC	6.60E+01
T4	Surface Soil	METALS	Cadmium	mg/kg dw	10	10	100%	10	0.95	0.96	Lognormal	4.60E-01	1.62E+00	3.20E+00	2.12E+00	2.67E+00	2.67E+00	2.67E+00
T4	Surface Soil	METALS	Calcium	mg/kg dw	10	10	100%	10	0.67	0.88	Lognormal	6.00E+03	5.13E+04	1.50E+05	7.99E+04	2.88E+05	2.88E+05	1.50E+05
T4	Surface Soil	SVOA	Carbazole	ug/kg dw	10	5	50%	10	0.44	0.64	Lognormal	6.20E+01	1.68E+02	1.00E+03	3.54E+02	3.26E+02	3.26E+02	3.26E+02
T4	Surface Soil	METALS	Chromium	mg/kg dw	10	10	100%	10	0.93	0.97	Lognormal	1.10E+01	1.76E+01	2.90E+01	2.07E+01	2.14E+01	2.14E+01	2.14E+01
T4	Surface Soil	SVOA	Chrysene	ug/kg dw	10	9	90%	10	0.56	0.94	Lognormal	3.50E+01	7.10E+02	4.40E+03	1.49E+03	6.58E+03	6.58E+03	4.40E+03
T4	Surface Soil	METALS	Cobalt	mg/kg dw	10	10	100%	10	0.95	0.96	Lognormal	3.40E+00	6.40E+00	1.00E+01	7.49E+00	7.84E+00	7.84E+00	7.84E+00
T4	Surface Soil	METALS	Copper	mg/kg dw	10	10	100%	10	0.74	0.95	Lognormal	2.55E+01	6.51E+01	1.60E+02	9.04E+01	9.81E+01	9.81E+01	9.81E+01
T4	Surface Soil	PEST	delta BHC	ug/kg dw	10	4	40%	3	1.00	0.98	Normal	8.20E-02	1.64E-01	2.40E-01	2.97E-01	2.78E+00	2.97E-01	2.40E-01
T4	Surface Soil	SVOA	Dibenzo(a,h)anthracene	ug/kg dw	10	1	10%	10	0.39	0.51	Lognormal	4.50E+01	1.31E+02	8.10E+02	2.69E+02	2.35E+02	2.35E+02	2.35E+02
T4	Surface Soil	SVOA	Dibenzofuran	ug/kg dw	10	3	30%	10	0.45	0.67	Lognormal	4.50E+01	1.63E+02	7.70E+02	2.87E+02	2.76E+02	2.76E+02	2.76E+02
T4	Surface Soil	HERB	Dicamba	ug/kg dw	10	2	20%	2	1.00	1.00	Lognormal	1.50E+00	1.63E+00	1.75E+00	2.41E+00	NC	NC	1.75E+00
T4	Surface Soil	PEST	Dieldrin	ug/kg dw	10	6	60%	10	0.57	0.80	Lognormal	1.15E+00	2.84E+00	1.00E+01	4.34E+00	4.35E+00	4.35E+00	4.35E+00
T4	Surface Soil	PEST	Endosulfan sulfate	ug/kg dw	10	2	20%	2	1.00	1.00	Normal	1.00E-01	1.20E-01	1.40E-01	2.46E-01	NC	2.46E-01	1.40E-01
T4	Surface Soil	PEST	Endrin ketone	ug/kg dw	10	4	40%	10	0.86	0.88	Normal	1.70E-01	1.90E+00	4.00E+00	2.45E+00	4.75E+00	2.45E+00	2.45E+00
T4	Surface Soil	SVOA	Fluoranthene	ug/kg dw	10	9	90%	10	0.57	0.95	Lognormal	4.10E+01	1.58E+03	1.00E+04	3.36E+03	3.63E+04	3.63E+04	1.00E+04
T4	Surface Soil	SVOA	Fluorene	ug/kg dw	10	4	40%	10	0.46	0.75	Lognormal	4.40E+01	2.33E+02	1.40E+03	4.72E+02	5.03E+02	5.03E+02	5.03E+02
T4	Surface Soil	PEST	Gamma Chlordane	ug/kg dw	10	4	40%	10	0.57	0.64	Lognormal	9.00E-01	1.83E+00	6.60E+00	2.91E+00	3.09E+00	3.09E+00	3.09E+00
T4	Surface Soil	PEST	Heptachlor	ug/kg dw	10	2	20%	2	1.00	1.00	Lognormal	3.40E-01	4.90E-01	6.40E-01	1.44E+00	NC	NC	6.40E-01
T4	Surface Soil	PEST	Heptachlor epoxide	ug/kg dw	10	3	30%	10	0.76	0.75	Normal	1.90E-01	1.01E+00	2.30E+00	1.31E+00	1.73E+00	1.31E+00	1.31E+00
T4	Surface Soil	SVOA	Indeno(1,2,3-cd)pyrene	ug/kg dw	10	4	40%	10	0.52	0.69	Lognormal	9.00E+01	3.55E+02	2.00E+03	7.02E+02	9.56E+02	9.56E+02	9.56E+02
T4	Surface Soil	METALS	Iron	mg/kg dw	10	10	100%	10	0.93	0.90	Normal	7.70E+03	1.54E+04	2.10E+04	1.78E+04	1.89E+04	1.78E+04	1.78E+04
T4	Surface Soil	METALS	Lead	mg/kg dw	10	10	100%	10	0.87	0.97	Lognormal	2.80E+01	1.00E+02	2.60E+02	1.43E+02	1.95E+02	1.95E+02	1.95E+02
T4	Surface Soil	METALS	Magnesium	mg/kg dw	10	10	100%	10	0.74	0.86	Lognormal	3.70E+03	7.63E+03	2.10E+04	1.08E+04	1.18E+04	1.18E+04	1.18E+04
T4	Surface Soil	METALS	Manganese	mg/kg dw	10	10	100%	10	0.92	0.82	Normal	1.80E+02	4.14E+02	6.10E+02	4.78E+02	5.18E+02	4.78E+02	4.78E+02
T4	Surface Soil	HERB	MCPA[(4-chloro-2-methylphenoxy)-acetic a	ug/kg dw	10	3	30%	10	0.69	0.75	Lognormal	1.00E+03	1.57E+03	3.70E+03	2.07E+03	2.15E+03	2.15E+03	2.15E+03
T4	Surface Soil	METALS	Mercury	mg/kg dw	10	10	100%	10	0.52	0.85	Lognormal	2.70E-02	1.22E-01	5.70E-01	2.14E-01	2.30E-01	2.30E-01	2.30E-01
T4	Surface Soil	PEST	Methoxychlor	ug/kg dw	10	5	50%	7	0.84	0.79	Normal	9.30E-01	6.20E+00	9.70E+00	8.97E+00	3.07E+01	8.97E+00	8.97E+00
T4	Surface Soil	METALS	Molybdenum	mg/kg dw	10	10	100%	10	0.80	0.97	Lognormal	3.20E-01	1.02E+00	2.30E+00	1.34E+00	1.60E+00	1.60E+00	1.60E+00
T4	Surface Soil	SVOA	Naphthalene	ug/kg dw	10	2	20%	2	1.00	1.00	Normal	4.10E+01	6.00E+01	7.90E+01	1.80E+02	NC	1.80E+02	7.90E+01
T4	Surface Soil	METALS	Nickel	mg/kg dw	10	10	100%	10	0.92	0.92	Normal	1.20E+01	1.82E+01	2.40E+01	2.01E+01	2.05E+01	2.01E+01	2.01E+01
T4	Surface Soil	SVOA	Pentachlorophenol	ug/kg dw	10	10	100%	10	0.82	0.66	Lognormal	2.21E+02	2.89E+02	5.03E+02	3.47E+02	3.49E+02	3.49E+02	3.49E+02
T4	Surface Soil	SVOA	Phenanthrene	ug/kg dw	10	7	70%	10	0.52	0.86	Lognormal	7.50E+01	1.35E+03	9.20E+03	2.99E+03	1.38E+04	1.38E+04	9.20E+03
T4	Surface Soil	METALS	Potassium	mg/kg dw	10	10	100%	10	0.97	0.96	Normal	1.20E+03	1.84E+03	2.60E+03	2.07E+03	2.13E+03	2.07E+03	2.07E+03
T4	Surface Soil	SVOA	Pyrene	ug/kg dw	10	7	70%	10	0.56	0.88	Lognormal	9.50E+01	1.35E+03	8.50E+03	2.87E+03	1.11E+04	1.11E+04	8.50E+03
T4	Surface Soil	METALS	Selenium	mg/kg dw	10	1	10%	10	0.70	0.77	Lognormal	4.88E-01	5.79E-01	8.80E-01	6.44E-01	6.43E-01	6.43E-01	6.43E-01
T4	Surface Soil	METALS	Silver	mg/kg dw	10	3	30%	3	0.92	0.95	Lognormal	2.40E-01	3.25E-01	4.45E-01	5.05E-01	8.62E-01	8.62E-01	4.45E-01
T4	Surface Soil	METALS	Thallium	mg/kg dw	10	3	30%	10	0.71	0.76	Lognormal	4.88E-01	6.64E-01	1.10E+00	8.02E-01	8.16E-01	8.16E-01	8.16E-01
T4	Surface Soil	VOA	Toluene	ug/kg dw	10	1	10%	10	0.86	0.93	Lognormal	2.05E+00	2.86E+00	4.50E+00	3.28E+00	3.31E+00	3.31E+00	3.31E+00
T4	Surface Soil	PCB	Total PCBs	ug/kg dw	10	5	50%	10	0.79	0.76	Normal	7.60E+00	3.21E+01	5.80E+01	4.37E+01	7.79E+01	4.37E+01	4.37E+01
T4	Surface Soil	METALS	Vanadium	mg/kg dw	10	10	100%	10	0.97	0.95	Normal	1.50E+01	2.58E+01	3.50E+01	2.93E+01	3.04E+01	2.93E+01	2.93E+01
T4	Surface Soil	METALS	Zinc	mg/kg dw	10	10	100%	10	0.88	0.97	Lognormal	7.60E+01	2.22E+02	5.50E+02	3.04E+02	3.75E+02	3.75E+02	3.75E+02

B-19

TABLE
SAMPLES USED IN CALCULATION OF SITE CONCENTRATIONS
T4 Surface Soil

Area	Medium	Sample	Date Collected	Beginning Depth (ft)	Ending Depth (ft)
T4	Surface Soil	DAS-T4-S1-0-0.5FT	4/19/00	0	0.5
T4	Surface Soil	DAS-T4-S2-0-0.5FT	4/20/00	0	0.5
T4	Surface Soil	DAS-T4-S3-0-0.5FT	4/20/00	0	0.5
T4	Surface Soil	UAS-T4-S1-0-0.5FT	11/16/99	0	0.5
T4	Surface Soil	UAS-T4-S2-0-0.5FT	11/16/99	0	0.5
T4	Surface Soil	UAS-T4-S3-0-0.5FT	11/16/99	0	0.5
T4	Surface Soil	UAS-T4-S4-0-0.5FT	11/16/99	0	0.5
T4	Surface Soil	UAS-T4-S5-0-0.5FT	11/16/99	0	0.5
T4	Surface Soil	UAS-T4-S6-0-0.5FT	11/16/99	0	0.5
T4	Surface Soil	UAS-T4-S7-0-0.5FT	11/17/99	0	0.5

Table
Site Concentration Selection
T3 Surface Soil

Area	Medium	Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for Statistics	Shapiro-Wilke's Test for Normality(a)			Summary Statistics			95% Upper Confidence Limit			Site Concentration (c)
									Normal	Lognormal	Dataset Distribution	Minimum	Mean	Maximum	t-Test	H-Test	UCL (b)	
T3	Surface Soil	8280A	1998 Total TEQ w/ EMPC as ND	ug/kg dw	4	4	100%	4	0.94	0.96	Lognormal	2.66E-03	3.07E-03	3.66E-03	3.58E-03	3.75E-03	3.75E-03	3.66E-03
T3	Surface Soil	HERB	2,4 DB	ug/kg dw	10	1	10%	10	0.44	0.56	Lognormal	4.35E+00	8.89E+00	4.10E+01	1.55E+01	1.44E+01	1.44E+01	1.44E+01
T3	Surface Soil	VOA	2-Butanone (MEK)	ug/kg dw	10	6	60%	10	0.87	0.84	Normal	1.40E+01	2.77E+01	4.70E+01	3.52E+01	4.08E+01	3.52E+01	3.52E+01
T3	Surface Soil	VOA	2-Hexanone	ug/kg dw	10	1	10%	1	NC	NC	NC	6.90E+00	6.90E+00	6.90E+00	NC	NC	NC	6.90E+00
T3	Surface Soil	PEST	4,4'-DDE	ug/kg dw	10	5	50%	5	0.82	0.90	Lognormal	1.10E-01	6.22E-01	1.70E+00	1.28E+00	2.34E+01	2.34E+01	1.70E+00
T3	Surface Soil	PEST	4,4'-DDT	ug/kg dw	10	4	40%	5	0.89	0.88	Normal	4.00E-01	1.21E+00	1.80E+00	1.81E+00	3.96E+00	1.81E+00	1.80E+00
T3	Surface Soil	VOA	Acetone	ug/kg dw	10	8	60%	10	0.85	0.74	Normal	2.85E+01	3.08E+02	6.70E+02	4.59E+02	3.40E+03	4.59E+02	4.59E+02
T3	Surface Soil	PEST	Alpha Chlordane	ug/kg dw	10	2	20%	10	0.41	0.48	Lognormal	9.00E-01	1.48E+00	5.80E+00	2.36E+00	2.15E+00	2.15E+00	2.15E+00
T3	Surface Soil	METALS	Aluminum	mg/kg dw	10	10	100%	10	0.94	0.96	Lognormal	3.30E+03	9.46E+03	1.70E+04	1.20E+04	1.39E+04	1.39E+04	1.39E+04
T3	Surface Soil	SVOA	Anthracene	ug/kg dw	10	2	20%	2	1.00	1.00	Lognormal	2.60E+01	3.85E+01	5.10E+01	1.17E+02	NC	NC	5.10E+01
T3	Surface Soil	METALS	Antimony	mg/kg dw	10	4	40%	10	0.64	0.71	Lognormal	1.03E+00	1.20E+00	1.90E+00	1.35E+00	1.34E+00	1.34E+00	1.34E+00
T3	Surface Soil	METALS	Arsenic	mg/kg dw	10	10	100%	10	0.96	0.88	Normal	2.60E+00	6.64E+00	9.70E+00	7.88E+00	8.73E+00	7.88E+00	7.88E+00
T3	Surface Soil	METALS	Barium	mg/kg dw	10	10	100%	10	0.84	0.87	Normal	4.00E+01	1.65E+02	2.20E+02	1.95E+02	2.49E+02	1.95E+02	1.95E+02
T3	Surface Soil	VOA	Benzene	ug/kg dw	10	1	10%	1	NC	NC	NC	2.10E+00	2.10E+00	2.10E+00	NC	NC	NC	2.10E+00
T3	Surface Soil	SVOA	Benzo(a)anthracene	ug/kg dw	10	5	50%	10	0.56	0.85	Lognormal	2.30E+01	1.20E+02	4.80E+02	1.95E+02	2.42E+02	2.42E+02	2.42E+02
T3	Surface Soil	SVOA	Benzo(a)pyrene	ug/kg dw	10	4	40%	10	0.41	0.55	Lognormal	4.30E+01	1.37E+02	8.60E+02	2.84E+02	2.56E+02	2.56E+02	2.56E+02
T3	Surface Soil	SVOA	Benzo(b)fluoranthene	ug/kg dw	10	6	60%	10	0.46	0.81	Lognormal	2.70E+01	1.64E+02	9.70E+02	3.29E+02	3.96E+02	3.96E+02	3.96E+02
T3	Surface Soil	SVOA	Benzo(g,h,i)perylene	ug/kg dw	10	5	50%	10	0.46	0.74	Lognormal	3.80E+01	1.54E+02	8.30E+02	2.92E+02	2.92E+02	2.92E+02	2.92E+02
T3	Surface Soil	SVOA	Benzo(k)fluoranthene	ug/kg dw	10	4	40%	10	0.43	0.68	Lognormal	3.80E+01	1.78E+02	1.00E+03	3.46E+02	3.37E+02	3.37E+02	3.37E+02
T3	Surface Soil	METALS	Beryllium	mg/kg dw	10	9	90%	10	0.95	0.97	Lognormal	1.60E-01	5.87E-01	1.10E+00	7.57E-01	9.15E-01	9.15E-01	9.15E-01
T3	Surface Soil	PEST	beta BHC	ug/kg dw	10	1	10%	10	0.43	0.48	Lognormal	2.75E-01	3.38E-01	7.50E-01	4.27E-01	4.09E-01	4.09E-01	4.09E-01
T3	Surface Soil	SVOA	bis(2-Ethylhexyl)phthalate	ug/kg dw	10	4	40%	10	0.49	0.65	Lognormal	6.10E+01	1.31E+02	4.30E+02	1.92E+02	1.84E+02	1.84E+02	1.84E+02
T3	Surface Soil	METALS	Cadmium	mg/kg dw	10	10	100%	10	0.91	0.95	Lognormal	1.50E+00	2.34E+00	3.80E+00	2.72E+00	2.80E+00	2.80E+00	2.80E+00
T3	Surface Soil	METALS	Calcium	mg/kg dw	10	10	100%	10	0.42	0.78	Lognormal	3.50E+03	3.27E+04	2.50E+05	7.71E+04	1.07E+05	1.07E+05	1.07E+05
T3	Surface Soil	SVOA	Carbazole	ug/kg dw	10	1	10%	1	NC	NC	NC	8.80E+01	8.80E+01	8.80E+01	NC	NC	NC	8.80E+01
T3	Surface Soil	METALS	Chromium	mg/kg dw	10	10	100%	10	0.89	0.92	Lognormal	1.10E+01	1.59E+01	2.30E+01	1.64E+01	1.69E+01	1.69E+01	1.69E+01
T3	Surface Soil	SVOA	Chrysene	ug/kg dw	10	7	70%	10	0.46	0.80	Lognormal	2.80E+01	1.63E+02	9.80E+02	3.30E+02	4.17E+02	4.17E+02	4.17E+02
T3	Surface Soil	METALS	Cobalt	mg/kg dw	10	10	100%	10	0.92	0.83	Normal	2.30E+00	6.50E+00	1.00E+01	7.75E+00	8.76E+00	7.75E+00	7.75E+00
T3	Surface Soil	METALS	Copper	mg/kg dw	10	10	100%	10	0.93	0.91	Normal	4.80E+01	6.56E+01	7.90E+01	7.19E+01	7.32E+01	7.19E+01	7.19E+01
T3	Surface Soil	SVOA	Dibenzo(a,h)anthracene	ug/kg dw	10	1	10%	10	0.39	0.43	Lognormal	5.00E+01	7.15E+01	2.50E+02	1.08E+02	9.93E+01	9.93E+01	9.93E+01
T3	Surface Soil	HERB	Dicamba	ug/kg dw	10	2	20%	3	0.76	0.78	Lognormal	1.60E+00	8.60E+00	2.30E+01	2.95E+01	1.59E+10	1.59E+10	2.30E+01
T3	Surface Soil	PEST	Dieldrin	ug/kg dw	10	4	40%	4	0.85	0.82	Normal	8.70E-01	9.28E-01	1.08E+00	1.14E+00	1.32E+00	1.14E+00	1.08E+00
T3	Surface Soil	PEST	Endrin ketone	ug/kg dw	10	2	20%	2	1.00	1.00	Lognormal	1.70E-01	4.60E-01	7.50E-01	2.29E+00	NC	NC	7.50E-01
T3	Surface Soil	SVOA	Fluoranthene	ug/kg dw	10	6	60%	10	0.48	0.83	Lognormal	3.70E+01	2.49E+02	1.50E+03	5.06E+02	6.15E+02	6.15E+02	6.15E+02
T3	Surface Soil	PEST	Gamma Chlordane	ug/kg dw	10	3	30%	10	0.51	0.70	Lognormal	5.80E-01	1.40E+00	5.10E+00	2.16E+00	2.09E+00	2.09E+00	2.09E+00
T3	Surface Soil	SVOA	Indeno(1,2,3-cd)pyrene	ug/kg dw	10	1	10%	10	0.38	0.42	Lognormal	9.50E+01	1.59E+02	6.80E+02	2.67E+02	2.38E+02	2.38E+02	2.38E+02
T3	Surface Soil	METALS	Iron	mg/kg dw	10	10	100%	10	0.93	0.79	Normal	4.10E+03	1.45E+04	2.20E+04	1.74E+04	2.09E+04	1.74E+04	1.74E+04
T3	Surface Soil	METALS	Lead	mg/kg dw	10	10	100%	10	0.90	0.95	Lognormal	3.55E+01	5.45E+01	9.00E+01	6.36E+01	6.53E+01	6.53E+01	6.53E+01
T3	Surface Soil	METALS	Magnesium	mg/kg dw	10	10	100%	10	0.84	0.85	Lognormal	3.00E+03	6.25E+03	1.80E+04	6.75E+03	8.94E+03	8.94E+03	8.94E+03
T3	Surface Soil	METALS	Manganese	mg/kg dw	10	10	100%	10	0.94	0.83	Normal	1.20E+02	3.79E+02	6.10E+02	4.55E+02	5.33E+02	4.55E+02	4.55E+02
T3	Surface Soil	HERB	MCPA	ug/kg dw	10	2	20%	9	0.54	NC	NC	1.05E+03	1.54E+03	4.00E+03	2.13E+03	NC	2.13E+03	2.13E+03
T3	Surface Soil	HERB	MCPP	ug/kg dw	10	2	20%	10	0.62	0.70	Lognormal	1.05E+03	2.25E+03	7.70E+03	3.51E+03	3.90E+03	3.90E+03	3.90E+03
T3	Surface Soil	METALS	Mercury	mg/kg dw	10	10	100%	10	0.96	0.98	Lognormal	4.20E-02	6.27E-02	9.30E-02	7.18E-02	7.35E-02	7.35E-02	7.35E-02
T3	Surface Soil	PEST	Methoxychlor	ug/kg dw	10	1	10%	1	NC	NC	NC	2.60E+00	2.60E+00	2.60E+00	NC	NC	NC	2.60E+00
T3	Surface Soil	METALS	Molybdenum	mg/kg dw	10	10	100%	10	0.91	0.95	Lognormal	3.70E-01	7.38E-01	1.40E+00	9.40E-01	1.04E+00	1.04E+00	1.04E+00
T3	Surface Soil	METALS	Nickel	mg/kg dw	10	10	100%	10	0.87	0.89	Lognormal	1.40E+01	1.86E+01	2.60E+01	2.11E+01	2.15E+01	2.15E+01	2.15E+01
T3	Surface Soil	SVOA	Pentachlorophenol	ug/kg dw	10	2	20%	10	0.42	0.46	Lognormal	2.23E+02	2.87E+02	7.40E+02	3.87E+02	3.71E+02	3.71E+02	3.71E+02
T3	Surface Soil	SVOA	Phenanthrene	ug/kg dw	10	4	40%	10	0.49	0.70	Lognormal	2.40E+01	1.33E+02	5.30E+02	2.15E+02	2.47E+02	2.47E+02	2.47E+02
T3	Surface Soil	METALS	Potassium	mg/kg dw	10	10	100%	10	0.95	0.97	Lognormal	1.20E+03	2.18E+03	3.70E+03	2.61E+03	2.76E+03	2.76E+03	2.76E+03
T3	Surface Soil	SVOA	Pyrene	ug/kg dw	10	3	30%	10	0.40	0.51	Lognormal	9.50E+01	2.39E+02	1.40E+03	4.75E+02	4.20E+02	4.20E+02	4.20E+02
T3	Surface Soil	METALS	Selenium	mg/kg dw	10	2	20%	10	0.40	0.46	Lognormal	5.00E-01	8.30E-01	3.20E+00	1.31E+00	1.19E+00	1.19E+00	1.19E+00
T3	Surface Soil	METALS	Silver	mg/kg dw	10	4	40%	4	0.94	0.93	Normal	2.00E-01	2.98E-01	3.80E-01	3.95E-01	5.20E-01	3.95E-01	3.80E-01
T3	Surface Soil	METALS	Thallium	mg/kg dw	10	3	30%	10	0.68	0.75	Lognormal	5.00E-01	6.93E-01	1.40E+00	8.54E-01	8.58E-01	8.58E-01	8.58E-01
T3	Surface Soil	VOA	Toluene	ug/kg dw	10	3	30%	10	0.71	0.78	Lognormal	2.50E+00	3.17E+00	5.30E+00	3.68E+00	3.68E+00	3.66E+00	3.66E+00
T3	Surface Soil	PCB	Total PCBs	ug/kg dw	10	9	90%	10	0.88	0.83	Normal	1.30E+01	6.29E+01	1.16E+02	8.51E+01	1.51E+02	8.51E+01	8.51E+01
T3	Surface Soil	METALS	Vanadium	mg/kg dw	10	10	100%	10	0.94	0.95	Lognormal	1.30E+01	2.68E+01	4.20E+01	3.17E+01	3.37E+01	3.37E+01	3.37E+01
T3	Surface Soil	METALS	Zinc	mg/kg dw	10	10	100%	10	0.88	0.93	Lognormal	1.59E+02	2.70E+02	4.60E+02	3.27E+02	3.42E+02	3.42E+02	3.42E+02

TABLE
SAMPLES USED IN CALCULATION OF SITE CONCENTRATIONS
T3 Surface Soil

Area	Medium	Sample	Date Collected	Beginning Depth (ft)	Ending Depth (ft)
T3	Surface Soil	DAS-T3-S1-0-0.5FT	4/19/00	0	0.5
T3	Surface Soil	DAS-T3-S2-0-0.5FT	4/19/00	0	0.5
T3	Surface Soil	DAS-T3-S3-0-0.5FT	4/19/00	0	0.5
T3	Surface Soil	UAS-T3-S1-0-0.5FT	11/15/99	0	0.5
T3	Surface Soil	UAS-T3-S2-0-0.5FT	11/15/99	0	0.5
T3	Surface Soil	UAS-T3-S3-0-0.5FT	11/15/99	0	0.5
T3	Surface Soil	UAS-T3-S4-0-0.5FT	11/15/99	0	0.5
T3	Surface Soil	UAS-T3-S5-0-0.5FT	11/15/99	0	0.5
T3	Surface Soil	UAS-T3-S6-0-0.5FT	11/15/99	0	0.5
T3	Surface Soil	UAS-T3-S7-0-0.5FT	11/15/99	0	0.5

Table
Site Concentration Selection
T2 Surface Soil

Area	Medium	Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for Statistics	Shapiro-Wilke's Test for Normality(a)			Summary Statistics			95% Upper Confidence Limit			Site Concentration (c)
									Normal	Lognormal	Dataset Distribution	Minimum	Mean	Maximum	t-Test	H-Test	UCL (b)	
T2	Surface Soil	8280A	1998 Total TEQ w/ EMPC as ND	ug/kg dw	4	4	100%	4	0 83	0 84	Lognormal	2 10E 03	5 87E-03	9 94E-03	1 06E-02	1 79E 01	1 79E-01	9 94E-03
T2	Surface Soil	VOA	2 Butanone (MEK)	ug/kg	9	6	67%	9	0 94	0 84	Lognormal	1 20E+01	2 18E+01	3 40E+01	2 68E+01	2 91E+01	2 91E+01	2 91E+01
T2	Surface Soil	VOA	2 Hexanone	ug/kg dw	9	1	11%	1	NC	NC	NC	4 80E+00	4 80E+00	4 80E+00	NC	NC	NC	4 80E+00
T2	Surface Soil	PEST	4,4'-DDD	ug/kg dw	9	1	11%	1	NC	NC	NC	5 60E 01	5 60E-01	5 60E-01	NC	NC	NC	5 60E-01
T2	Surface Soil	PEST	4,4' DDE	ug/kg dw	9	3	33%	3	0 92	0 89	Normal	2 40E-01	3 80E 01	4 80E-01	5 91E-01	1 38E+00	5 91E 01	4 80E 01
T2	Surface Soil	PEST	4,4' DDT	ug/kg dw	9	5	56%	9	0 54	0 92	Lognormal	1 40E 01	2 62E+00	1 40E+01	5 30E+00	1 71E+01	1 71E+01	1 40E+01
T2	Surface Soil	VOA	Acetone	ug/kg	9	6	67%	9	0 88	0 80	Normal	2 90E+01	2 17E+02	4 50E+02	3 19E+02	1 24E+03	3 19E+02	3 19E+02
T2	Surface Soil	METALS	Aluminum	mg/kg dw	9	9	100%	9	0 86	0 91	Lognormal	7 20E+03	1 21E+04	1 80E+04	1 44E+04	1 50E+04	1 50E+04	1 50E+04
T2	Surface Soil	METALS	Antimony	mg/kg dw	9	6	67%	9	0 96	0 92	Normal	6 70E 01	1 21E+00	1 70E+00	1 40E+00	1 48E+00	1 40E+00	1 40E+00
T2	Surface Soil	METALS	Arsenic	mg/kg dw	9	9	100%	9	0 92	0 92	Lognormal	6 00E+00	7 94E+00	1 00E+01	8 83E+00	8 99E+00	8 99E+00	8 99E+00
T2	Surface Soil	METALS	Barium	mg/kg dw	9	9	100%	9	0 89	0 90	Lognormal	1 60E+02	1 92E+02	2 30E+02	2 08E+02	2 10E+02	2 10E+02	2 10E+02
T2	Surface Soil	SVOA	Benzo(a)anthracene	ug/kg dw	9	2	22%	2	1 00	1 00	Normal	4 60E+01	5 90E+01	7 20E+01	1 41E+02	NC	1 41E+02	7 20E+01
T2	Surface Soil	SVOA	Benzo(a)pyrene	ug/kg dw	9	2	22%	9	0 79	0 83	Lognormal	4 95E+01	5 64E+01	7 20E+01	6 05E+01	6 06E+01	6 06E+01	6 06E+01
T2	Surface Soil	SVOA	Benzo(b)fluoranthene	ug/kg dw	9	3	33%	3	0 92	0 97	Lognormal	3 20E+01	4 87E+01	7 20E+01	8 38E+01	2 40E+02	2 40E+02	7 20E+01
T2	Surface Soil	SVOA	Benzo(g,h,i)perylene	ug/kg dw	9	1	11%	1	NC	NC	NC	4 00E+01	4 00E+01	4 00E+01	NC	NC	NC	4 00E+01
T2	Surface Soil	SVOA	Benzo(k)fluoranthene	ug/kg dw	9	2	22%	2	1 00	1 00	Normal	5 30E+01	5 80E+01	6 30E+01	8 96E+01	NC	8 96E+01	6 30E+01
T2	Surface Soil	METALS	Beryllium	mg/kg dw	9	7	78%	9	0 94	0 94	Normal	3 60E-01	6 62E 01	1 10E+00	8 38E-01	9 25E-01	8 38E-01	8 38E-01
T2	Surface Soil	SVOA	bis(2-Ethylhexyl)phthalate	ug/kg dw	9	3	33%	3	0 83	0 85	Lognormal	5 70E+01	7 07E+01	9 40E+01	1 05E+02	1 50E+02	1 50E+02	9 40E+01
T2	Surface Soil	METALS	Cadmium	mg/kg dw	9	9	100%	9	0 87	0 79	Normal	1 10E+00	2 28E+00	2 80E+00	2 62E+00	2 84E+00	2 62E+00	2 62E+00
T2	Surface Soil	METALS	Calcium	mg/kg dw	9	9	100%	9	0 80	0 85	Lognormal	3 50E+03	8 18E+03	1 60E+04	1 13E+04	1 39E+04	1 39E+04	1 39E+04
T2	Surface Soil	METALS	Chromium	mg/kg dw	9	9	100%	9	0 72	0 85	Lognormal	1 30E+01	2 13E+01	4 80E+01	2 80E+01	2 88E+01	2 88E+01	2 88E+01
T2	Surface Soil	SVOA	Chrysene	ug/kg dw	9	3	33%	3	0 96	0 91	Normal	2 90E+01	6 23E+01	8 90E+01	1 14E+02	1 61E+03	1 14E+02	8 90E+01
T2	Surface Soil	METALS	Cobalt	mg/kg dw	9	9	100%	9	0 79	0 81	Lognormal	6 40E+00	7 76E+00	1 10E+01	8 78E+00	8 86E+00	8 86E+00	8 86E+00
T2	Surface Soil	METALS	Copper	mg/kg dw	9	9	100%	9	0 96	0 98	Lognormal	5 30E+01	9 02E+01	1 40E+02	1 06E+02	1 10E+02	1 10E+02	1 10E+02
T2	Surface Soil	HERB	Dicamba	ug/kg dw	9	2	22%	2	1 00	1 00	Normal	1 30E+00	2 20E+00	3 10E+00	7 88E+00	NC	7 88E+00	3 10E+00
T2	Surface Soil	PEST	Dieldrin	ug/kg dw	9	1	11%	1	NC	NC	NC	1 30E+00	1 30E+00	1 30E+00	NC	NC	NC	1 30E+00
T2	Surface Soil	SVOA	Di n butylphthalate	ug/kg dw	9	1	11%	9	0 80	0 81	Lognormal	9 50E+01	1 03E+02	1 20E+02	1 08E+02	NC	NC	1 20E+02
T2	Surface Soil	PEST	Endosulfan sulfate	ug/kg dw	9	3	33%	3	0 87	0 82	Normal	1 10E-01	3 30E 01	4 70E-01	6 55E-01	1 43E+02	6 55E 01	4 70E-01
T2	Surface Soil	PEST	Endrin ketone	ug/kg dw	9	4	44%	4	0 87	0 83	Normal	1 30E-01	5 95E-01	1 30E+00	1 26E+00	1 09E+03	1 26E+00	1 26E+00
T2	Surface Soil	SVOA	Fluoranthene	ug/kg dw	9	2	22%	9	0 66	0 70	Lognormal	9 50E+01	1 08E+02	1 50E+02	1 18E+02	1 18E+02	1 18E+02	1 18E+02
T2	Surface Soil	PEST	Gamma Chlordane	ug/kg dw	9	4	11%	1	NC	NC	NC	2 00E-01	2 00E 01	2 00E-01	NC	NC	NC	2 00E-01
T2	Surface Soil	PEST	Heptachlor epoxide	ug/kg dw	9	2	22%	2	1 00	1 00	Normal	1 50E-01	1 70E 01	1 90E-01	2 98E 01	NC	2 98E-01	1 90E 01
T2	Surface Soil	METALS	Iron	mg/kg dw	9	9	100%	9	0 81	0 83	Lognormal	1 50E+04	1 90E+04	2 50E+04	2 16E+04	2 20E+04	2 20E+04	2 20E+04
T2	Surface Soil	METALS	Lead	mg/kg dw	9	9	100%	9	0 90	0 81	Normal	2 40E+01	6 47E+01	8 80E+01	7 72E+01	9 01E+01	7 72E+01	7 72E+01
T2	Surface Soil	METALS	Magnesium	mg/kg dw	9	9	100%	9	0 79	0 90	Lognormal	3 40E+03	5 16E+03	9 50E+03	6 28E+03	6 42E+03	6 42E+03	6 42E+03
T2	Surface Soil	METALS	Manganese	mg/kg dw	9	9	100%	9	0 78	0 89	Lognormal	3 40E+02	5 56E+02	1 20E+03	7 24E+02	7 59E+02	7 59E+02	7 59E+02
T2	Surface Soil	HERB	MCPA	ug/kg dw	9	2	22%	9	0 50	0 58	Lognormal	1 10E+03	1 75E+03	5 50E+03	2 64E+03	2 62E+03	2 62E+03	2 62E+03
T2	Surface Soil	HERB	MCPP	ug/kg dw	9	1	11%	9	0 41	0 45	Lognormal	1 10E+03	1 91E+03	7 60E+03	3 23E+03	3 07E+03	3 07E+03	3 07E+03
T2	Surface Soil	METALS	Mercury	mg/kg dw	9	9	100%	9	0 96	0 93	Normal	4 50E 02	6 91E 02	9 40E 02	7 92E-02	8 27E-02	7 92E 02	7 92E-02
T2	Surface Soil	PEST	Methoxychlor	ug/kg dw	9	2	22%	2	1 00	1 00	Lognormal	1 30E+00	4 30E+00	7 30E+00	2 32E+01	NC	NC	7 30E+00
T2	Surface Soil	VOA	Methylene chloride (Dichloromethane)	ug/kg dw	9	1	11%	1	NC	NC	NC	2 00E+00	2 00E+00	2 00E+00	NC	NC	NC	2 00E+00
T2	Surface Soil	METALS	Molybdenum	mg/kg dw	9	9	100%	9	0 93	0 95	Lognormal	4 60E-01	7 67E 01	1 30E+00	9 31E 01	9 92E-01	9 92E-01	9 92E-01
T2	Surface Soil	METALS	Nickel	mg/kg dw	9	9	100%	9	0 82	0 80	Normal	1 60E+01	2 18E+01	2 70E+01	2 41E+01	2 45E+01	2 41E+01	2 41E+01
T2	Surface Soil	SVOA	Pentachlorophenol	ug/kg dw	9	4	44%	4	0 79	0 79	Normal	2 33E+02	2 45E+02	2 51E+02	2 55E+02	NC	2 55E+02	2 51E+02
T2	Surface Soil	SVOA	Phenanthrene	ug/kg dw	9	2	22%	2	1 00	1 00	Lognormal	5 20E+01	5 65E+01	6 10E+01	8 49E+01	NC	NC	6 10E+01
T2	Surface Soil	METALS	Potassium	mg/kg dw	9	9	100%	9	0 91	0 94	Lognormal	1 70E+03	2 53E+03	3 80E+03	2 94E+03	3 02E+03	3 02E+03	3 02E+03
T2	Surface Soil	SVOA	Pyrene	ug/kg dw	9	2	22%	9	0 80	0 81	Lognormal	9 50E+01	1 03E+02	1 20E+02	1 08E+02	NC	NC	1 20E+02
T2	Surface Soil	METALS	Selenium	mg/kg dw	9	3	33%	9	0 62	0 59	Lognormal	4 95E 01	6 01E 01	1 00E+00	6 96E-01	6 94E 01	6 94E 01	6 94E 01
T2	Surface Soil	METALS	Silver	mg/kg dw	9	8	89%	8	0 93	0 92	Normal	2 30E 01	3 44E-01	4 80E-01	4 06E-01	4 29E 01	4 06E-01	4 06E-01
T2	Surface Soil	METALS	Thallium	mg/kg dw	9	4	44%	9	0 79	0 86	Lognormal	4 95E-01	7 21E-01	1 30E+00	8 86E-01	9 11E-01	9 11E-01	9 11E-01
T2	Surface Soil	VOA	Toluene	ug/kg dw	9	1	11%	8	0 95	0 95	Lognormal	2 60E+00	3 02E+00	3 40E+00	3 21E+00	NC	NC	3 40E+00
T2	Surface Soil	PCB	Total PCBs	ug/kg dw	9	8	89%	9	0 90	0 92	Lognormal	9 50E+00	6 68E+01	1 64E+02	1 02E+02	2 76E+02	2 76E+02	1 64E+02
T2	Surface Soil	METALS	Vanadium	mg/kg dw	9	9	100%	9	0 59	0 76	Lognormal	2 40E+01	4 22E+01	1 20E+02	6 08E+01	6 13E+01	6 13E+01	6 13E+01
T2	Surface Soil	METALS	Zinc	mg/kg dw	9	9	100%	9	0 92	0 88	Normal	1 40E+02	2 46E+02	3 10E+02	2 60E+02	2 95E+02	2 80E+02	2 80E+02

TABLE
SAMPLES USED IN CALCULATION OF SITE CONCENTRATIONS
T2 Surface Soil

Area	Medium	Sample	Date Collected	Beginning Depth (ft)	Ending Depth (ft)
T2	Surface Soil	DAS-T2-S1-0-0.5FT	4/18/00	0	0.5
T2	Surface Soil	DAS-T2-S2-0-0.5FT	4/18/00	0	0.5
T2	Surface Soil	DAS-T2-S3-0-0.5FT	4/18/00	0	0.5
T2	Surface Soil	UAS-T2-S1-0-0.5FT	11/12/99	0	0.5
T2	Surface Soil	UAS-T2-S2-0-0.5FT	11/12/99	0	0.5
T2	Surface Soil	UAS-T2-S3-0-0.5FT	11/12/99	0	0.5
T2	Surface Soil	UAS-T2-S4-0-0.5FT	11/12/99	0	0.5
T2	Surface Soil	UAS-T2-S5-0-0.5FT	11/12/99	0	0.5
T2	Surface Soil	UAS-T2-S6-0-0.5FT	11/12/99	0	0.5

Table
Site Concentration Selection
T1 Surface Soil

Area	Medium	Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for Statistics	Shapiro-Wilke's Test for Normality(a)			Summary Statistics			95% Upper Confidence Limit			Site Concentration (c)
									Normal	Lognormal	Dataset Distribution	Minimum	Mean	Maximum	t-Test	H-Test	UCL (b)	
T1	Surface Soil	8280A	1998 Total TEQ w/ EMPC as ND	ug/kg dw	5	5	100%	5	0.90	0.90	Lognormal	2.21E-03	6.16E-03	1.31E-02	1.01E-02	1.87E-02	1.87E-02	1.31E-02
T1	Surface Soil	HERB	2,4 D	ug/kg dw	10	1	10%	1	NC	NC	NC	3.60E+00	3.60E+00	3.60E+00	NC	NC	NC	3.60E+00
T1	Surface Soil	VOA	2-Butanone (MEK)	ug/kg dw	10	2	20%	10	0.72	0.79	Lognormal	1.20E+01	1.81E+01	3.20E+01	2.18E+01	2.21E+01	2.21E+01	2.21E+01
T1	Surface Soil	VOA	2-Hexanone	ug/kg dw	10	1	10%	1	NC	NC	NC	6.60E+00	6.60E+00	6.60E+00	NC	NC	NC	6.60E+00
T1	Surface Soil	PEST	4,4'-DDE	ug/kg dw	10	7	70%	7	0.96	0.92	Normal	8.60E-02	3.04E-01	5.65E-01	4.27E-01	7.00E-01	4.27E-01	4.27E-01
T1	Surface Soil	PEST	4,4'-DDT	ug/kg dw	10	5	50%	5	0.91	0.88	Normal	1.20E-01	4.81E-01	9.33E-01	8.17E-01	5.01E+00	8.17E-01	8.17E-01
T1	Surface Soil	VOA	Acetone	ug/kg dw	10	5	50%	10	0.78	0.78	Lognormal	2.40E+01	1.79E+02	4.40E+02	2.81E+02	1.05E+03	1.05E+03	4.40E+02
T1	Surface Soil	METALS	Aluminum	mg/kg dw	10	10	100%	10	0.84	0.84	Normal	5.80E+03	9.89E+03	1.50E+04	1.20E+04	1.30E+04	1.20E+04	1.20E+04
T1	Surface Soil	METALS	Antimony	mg/kg dw	10	8	80%	10	0.91	0.89	Normal	9.00E-01	1.84E+00	2.60E+00	2.21E+00	2.43E+00	2.21E+00	2.21E+00
T1	Surface Soil	METALS	Arsenic	mg/kg dw	10	10	100%	10	0.93	0.90	Normal	5.75E+00	8.10E+00	1.00E+01	8.86E+00	9.03E+00	8.86E+00	8.86E+00
T1	Surface Soil	METALS	Barium	mg/kg dw	10	10	100%	10	0.94	0.92	Normal	1.20E+02	1.83E+02	2.40E+02	2.05E+02	2.11E+02	2.05E+02	2.05E+02
T1	Surface Soil	VOA	Benzene	ug/kg dw	10	1	10%	7	0.81	0.79	Normal	2.40E+00	2.83E+00	3.00E+00	2.99E+00	NC	2.99E+00	2.99E+00
T1	Surface Soil	METALS	Beryllium	mg/kg dw	10	10	100%	10	0.88	0.88	Normal	4.15E-01	6.30E-01	9.40E-01	7.39E-01	7.71E-01	7.39E-01	7.39E-01
T1	Surface Soil	SVOA	bis(2-Ethylhexyl)phthalate	ug/kg dw	10	1	10%	10	0.61	0.67	Lognormal	9.00E+01	1.05E+02	1.60E+02	1.17E+02	1.16E+02	1.16E+02	1.16E+02
T1	Surface Soil	METALS	Cadmium	mg/kg dw	10	10	100%	10	0.91	0.94	Lognormal	1.70E+00	2.74E+00	4.80E+00	3.32E+00	3.49E+00	3.49E+00	3.49E+00
T1	Surface Soil	METALS	Calcium	mg/kg dw	10	10	100%	10	0.89	0.91	Lognormal	4.20E+03	5.91E+03	8.70E+03	6.79E+03	6.94E+03	6.94E+03	6.94E+03
T1	Surface Soil	VOA	Carbon disulfide	ug/kg dw	10	1	10%	2	1.00	1.00	Normal	2.40E+00	2.50E+00	2.60E+00	3.13E+00	NC	3.13E+00	2.60E+00
T1	Surface Soil	VOA	Chlorobenzene	ugkg dw	10	1	10%	10	0.88	0.92	Lognormal	2.40E+00	3.03E+00	4.00E+00	3.27E+00	3.28E+00	3.28E+00	3.28E+00
T1	Surface Soil	METALS	Chromium	mg/kg dw	10	10	100%	10	0.67	0.83	Lognormal	1.10E+01	1.89E+01	4.90E+01	2.54E+01	2.59E+01	2.59E+01	2.59E+01
T1	Surface Soil	METALS	Cobalt	mg/kg dw	10	10	100%	10	0.95	0.94	Normal	4.95E+00	7.01E+00	9.20E+00	7.83E+00	8.01E+00	7.83E+00	7.83E+00
T1	Surface Soil	METALS	Copper	mg/kg dw	10	10	100%	10	0.85	0.89	Lognormal	7.30E+01	1.32E+02	2.30E+02	1.67E+02	1.81E+02	1.81E+02	1.81E+02
T1	Surface Soil	HERB	Dicamba	ug/kg dw	10	4	40%	4	0.74	0.81	Lognormal	1.70E+00	3.06E+00	6.35E+00	5.67E+00	2.30E+01	2.30E+01	6.35E+00
T1	Surface Soil	PEST	Dieldrin	ug/kg dw	10	3	30%	3	0.76	0.87	Lognormal	8.90E-02	5.76E-01	1.50E+00	1.93E+00	1.44E+09	1.44E+09	1.50E+00
T1	Surface Soil	PEST	Endosulfan sulfate	ug/kg dw	10	4	40%	4	0.83	0.82	Normal	9.30E-02	2.81E-01	4.50E-01	4.79E-01	1.02E+01	4.79E-01	4.50E-01
T1	Surface Soil	PEST	Endrin ketone	ug/kg dw	10	7	70%	7	0.92	0.88	Lognormal	1.20E-01	2.86E-01	4.90E-01	3.52E-01	4.13E-01	4.13E-01	4.13E-01
T1	Surface Soil	SVOA	Fluoranthene	ug/kg dw	10	1	10%	1	NC	NC	NC	6.60E+01	6.60E+01	6.60E+01	NC	NC	NC	6.60E+01
T1	Surface Soil	PEST	Heptachlor epoxide	ug/kg dw	10	8	80%	8	0.90	0.92	Lognormal	9.00E-02	2.60E-01	5.07E-01	3.95E-01	7.44E-01	7.44E-01	5.07E-01
T1	Surface Soil	METALS	Iron	mg/kg dw	10	10	100%	10	0.93	0.94	Lognormal	1.15E+04	1.60E+04	2.20E+04	1.81E+04	1.85E+04	1.85E+04	1.85E+04
T1	Surface Soil	METALS	Lead	mg/kg dw	10	10	100%	10	0.92	0.93	Lognormal	4.00E+01	7.29E+01	1.20E+02	8.83E+01	9.49E+01	9.49E+01	9.49E+01
T1	Surface Soil	METALS	Magnesium	mg/kg dw	10	10	100%	10	0.94	0.90	Normal	3.20E+03	4.40E+03	5.30E+03	4.73E+03	4.79E+03	4.73E+03	4.73E+03
T1	Surface Soil	METALS	Manganese	mg/kg dw	10	10	100%	10	0.93	0.92	Normal	1.90E+02	3.65E+02	5.50E+02	4.36E+02	4.72E+02	4.36E+02	4.36E+02
T1	Surface Soil	HERB	MCPA	ug/kg dw	10	4	40%	10	0.71	0.77	Lognormal	1.10E+03	2.71E+03	7.40E+03	4.13E+03	5.38E+03	5.38E+03	5.38E+03
T1	Surface Soil	METALS	Mercury	mg/kg dw	10	10	100%	10	0.96	0.97	Lognormal	3.10E-02	6.25E-02	9.90E-02	7.51E-02	8.09E-02	8.09E-02	8.09E-02
T1	Surface Soil	PEST	Methoxychlor	ug/kg dw	10	5	50%	5	0.98	0.96	Normal	1.20E+00	2.06E+00	2.90E+00	2.72E+00	3.26E+00	2.72E+00	2.72E+00
T1	Surface Soil	VOA	Methylene chloride (Dichloromethane)	ug/kg dw	10	2	20%	3	0.75	0.75	Lognormal	1.80E+00	2.20E+00	2.40E+00	2.78E+00	3.19E+00	3.19E+00	2.40E+00
T1	Surface Soil	METALS	Molybdenum	mg/kg dw	10	10	100%	10	0.80	0.87	Lognormal	3.50E-01	5.03E-01	8.60E-01	6.00E-01	6.10E-01	6.10E-01	6.10E-01
T1	Surface Soil	METALS	Nickel	mg/kg dw	10	10	100%	10	0.95	0.94	Normal	1.40E+01	1.95E+01	2.50E+01	2.16E+01	2.21E+01	2.16E+01	2.16E+01
T1	Surface Soil	SVOA	Pentachlorophenol	ug/kg dw	10	9	90%	10	0.62	0.66	Lognormal	2.29E+02	2.96E+02	4.82E+02	3.51E+02	3.54E+02	3.54E+02	3.54E+02
T1	Surface Soil	METALS	Potassium	mg/kg dw	10	10	100%	10	0.85	0.85	Lognormal	1.30E+03	2.00E+03	2.80E+03	2.38E+03	2.48E+03	2.48E+03	2.48E+03
T1	Surface Soil	METALS	Selenium	mg/kg dw	10	2	20%	10	0.80	0.81	Lognormal	5.50E-01	6.18E-01	8.10E-01	6.70E-01	6.72E-01	6.72E-01	6.72E-01
T1	Surface Soil	METALS	Silver	mg/kg dw	10	9	90%	10	0.88	0.86	Lognormal	2.70E-01	3.94E-01	5.90E-01	4.66E-01	4.87E-01	4.87E-01	4.87E-01
T1	Surface Soil	METALS	Thallium	mg/kg dw	10	4	40%	10	0.87	0.89	Lognormal	5.50E-01	6.84E-01	9.80E-01	7.68E-01	7.76E-01	7.76E-01	7.76E-01
T1	Surface Soil	VOA	Toluene	ug/kg dw	10	2	20%	9	0.87	0.86	Normal	2.30E+00	2.84E+00	3.20E+00	3.03E+00	3.06E+00	3.03E+00	3.03E+00
T1	Surface Soil	PCB	Total PCBs	ug/kg dw	10	10	100%	10	0.90	0.92	Lognormal	2.80E+01	1.01E+02	2.31E+02	1.34E+02	1.73E+02	1.73E+02	1.73E+02
T1	Surface Soil	VOA	Trichloroethene	ug/kg dw	10	3	30%	10	0.71	0.80	Lognormal	2.73E+00	3.52E+00	8.20E+00	4.11E+00	4.11E+00	4.11E+00	4.11E+00
T1	Surface Soil	METALS	Vanadium	mg/kg dw	10	10	100%	10	0.90	0.90	Normal	1.80E+01	2.84E+01	4.10E+01	3.32E+01	3.48E+01	3.32E+01	3.32E+01
T1	Surface Soil	METALS	Zinc	mg/kg dw	10	10	100%	10	0.52	0.73	Lognormal	1.80E+02	3.88E+02	1.40E+03	5.97E+02	5.74E+02	5.74E+02	5.74E+02

TABLE
SAMPLES USED IN CALCULATION OF SITE CONCENTRATIONS
T1 Surface Soil

Area	Medium	Sample	Date Collected	Beginning Depth (ft)	Ending Depth (ft)
T1	Surface Soil	DAS-T1-S1-0-0.5FT	4/18/00	0	0.5
T1	Surface Soil	DAS-T1-S2-0-0.5FT	4/18/00	0	0.5
T1	Surface Soil	DAS-T1-S3-0-0.5FT	4/18/00	0	0.5
T1	Surface Soil	UAS-T1-S1-0-0.5FT	11/10/99	0	0.5
T1	Surface Soil	UAS-T1-S2-0-0.5FT	11/10/99	0	0.5
T1	Surface Soil	UAS-T1-S3-0-0.5FT	11/11/99	0	0.5
T1	Surface Soil	UAS-T1-S4-0-0.5FT	11/11/99	0	0.5
T1	Surface Soil	UAS-T1-S5-0-0.5FT	11/11/99	0	0.5
T1	Surface Soil	UAS-T1-S6-0-0.5FT	11/11/99	0	0.5
T1	Surface Soil	UAS-T1-S7-0-0.5FT	11/11/99	0	0.5

Table
Site Concentration Selection
Background Subsurface Soil

Area	Medium	Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for Statistics	Shapiro-Wilke's Test for Normality(a): Normal	Lognormal	Dataset Distribution	Summary Statistics: Minimum	Mean	Maximum	95% Upper Confidence Limit: t-Test	H-Test	UCL (b)	Site Concentration (c)
Background	Subsurface Soil	8280A	1998 Total TEQ w/ EMPC as ND	ug/kg dw	3	3	100%	3	0.85	0.97	Lognormal	1.60E-04	6.89E-04	1.55E-03	1.96E-03	1.88E+02	1.88E+02	1.55E-03
Background	Subsurface Soil	HERB	2,4,5 TP (Silvex)	ug/kg dw	3	1	33%	3	0.98	0.98	Normal	4.90E+00	5.40E+00	5.80E+00	6.17E+00	NC	6.17E+00	5.80E+00
Background	Subsurface Soil	VOA	Acetone	ug/kg dw	3	1	33%	1	NC	NC	NC	5.50E+00	5.50E+00	5.50E+00	NC	NC	NC	5.50E+00
Background	Subsurface Soil	METALS	Aluminum	mg/kg dw	3	3	100%	3	1.00	1.00	Lognormal	8.40E+03	1.01E+04	1.20E+04	1.32E+04	1.52E+04	1.52E+04	1.20E+04
Background	Subsurface Soil	METALS	Antimony	mg/kg dw	1	1	100%	1	NC	NC	NC	1.20E+00	1.20E+00	1.20E+00	NC	NC	NC	1.20E+00
Background	Subsurface Soil	METALS	Arsenic	mg/kg dw	3	3	100%	3	0.82	0.84	Lognormal	6.80E+00	8.70E+00	1.20E+01	1.35E+01	2.22E+01	2.22E+01	1.20E+01
Background	Subsurface Soil	METALS	Barium	mg/kg dw	3	3	100%	3	0.96	0.98	Normal	1.70E+02	1.87E+02	2.00E+02	2.12E+02	NC	2.12E+02	2.00E+02
Background	Subsurface Soil	SVOA	Benzo(a)anthracene	ug/kg dw	3	1	33%	1	NC	NC	NC	2.60E+01	2.60E+01	2.60E+01	NC	NC	NC	2.60E+01
Background	Subsurface Soil	SVOA	Benzo(g,h,i)perylene	ug/kg dw	3	1	33%	1	NC	NC	NC	3.40E+01	3.40E+01	3.40E+01	NC	NC	NC	3.40E+01
Background	Subsurface Soil	METALS	Beryllium	mg/kg dw	3	3	100%	3	0.88	0.86	Normal	5.00E-01	6.33E-01	7.20E-01	8.31E-01	1.00E+00	8.31E-01	7.20E-01
Background	Subsurface Soil	METALS	Cadmium	mg/kg dw	3	3	100%	3	0.85	0.99	Lognormal	1.10E-01	3.44E+00	8.90E+00	1.15E+01	3.63E+20	3.63E+20	8.90E+00
Background	Subsurface Soil	METALS	Calcium	mg/kg dw	3	3	100%	3	1.00	0.95	Normal	3.80E+03	8.07E+03	1.20E+04	1.50E+04	2.09E+05	1.50E+04	1.20E+04
Background	Subsurface Soil	METALS	Chromium	mg/kg dw	3	3	100%	3	0.75	0.75	Lognormal	1.30E+01	1.63E+01	1.80E+01	2.12E+01	2.52E+01	2.52E+01	1.80E+01
Background	Subsurface Soil	SVOA	Chrysene	ug/kg dw	3	1	33%	1	NC	NC	NC	4.20E+01	4.20E+01	4.20E+01	NC	NC	NC	4.20E+01
Background	Subsurface Soil	METALS	Cobalt	mg/kg dw	3	3	100%	3	0.95	0.98	Lognormal	6.40E+00	6.97E+00	7.70E+00	8.09E+00	NC	NC	7.70E+00
Background	Subsurface Soil	METALS	Copper	mg/kg dw	3	3	100%	3	0.88	1.00	Lognormal	1.10E+01	7.73E+01	1.80E+02	2.29E+02	8.06E+09	8.06E+09	1.80E+02
Background	Subsurface Soil	SVOA	Diethylphthalate	ug/kg dw	3	2	67%	3	0.83	0.81	Normal	6.30E+01	9.27E+01	1.10E+02	1.36E+02	2.37E+02	1.36E+02	1.10E+02
Background	Subsurface Soil	SVOA	Fluoranthene	ug/kg dw	3	1	33%	1	NC	NC	NC	4.20E+01	4.20E+01	4.20E+01	NC	NC	NC	4.20E+01
Background	Subsurface Soil	METALS	Iron	mg/kg dw	3	3	100%	3	0.75	0.75	Normal	1.40E+04	1.67E+04	1.80E+04	2.06E+04	2.27E+04	2.06E+04	1.80E+04
Background	Subsurface Soil	METALS	Lead	mg/kg dw	3	3	100%	3	0.92	0.99	Lognormal	8.50E+00	7.12E+01	1.60E+02	2.04E+02	5.77E+10	5.77E+10	1.60E+02
Background	Subsurface Soil	METALS	Magnesium	mg/kg dw	3	3	100%	3	0.89	0.86	Normal	3.10E+03	4.67E+03	5.70E+03	6.99E+03	1.33E+04	6.99E+03	5.70E+03
Background	Subsurface Soil	METALS	Manganese	mg/kg dw	3	3	100%	3	0.89	0.89	Normal	3.70E+02	4.00E+02	4.20E+02	4.45E+02	NC	4.45E+02	4.20E+02
Background	Subsurface Soil	HERB	MCPP[2-(4-chloro-2-methylphenoxy) propan	ug/kg dw	3	2	67%	3	0.79	0.78	Normal	1.20E+03	2.37E+03	3.00E+03	4.07E+03	2.99E+04	4.07E+03	3.00E+03
Background	Subsurface Soil	METALS	Mercury	mg/kg dw	3	3	100%	3	0.94	0.99	Lognormal	4.10E-03	2.80E-02	6.00E-02	7.66E-02	8.48E+05	8.48E+05	6.00E-02
Background	Subsurface Soil	VOA	Methylene chloride (Dichloromethane)	ug/kg dw	3	1	33%	1	NC	NC	NC	1.40E+00	1.40E+00	1.40E+00	NC	NC	NC	1.40E+00
Background	Subsurface Soil	METALS	Molybdenum	mg/kg dw	3	3	100%	3	0.84	0.89	Lognormal	5.00E-01	8.73E-01	1.50E+00	1.79E+00	2.07E+01	2.07E+01	1.50E+00
Background	Subsurface Soil	METALS	Nickel	mg/kg dw	3	3	100%	3	0.75	0.75	Normal	1.60E+01	1.87E+01	2.00E+01	2.26E+01	2.44E+01	2.26E+01	2.00E+01
Background	Subsurface Soil	METALS	Potassium	mg/kg dw	3	3	100%	3	0.89	0.88	Normal	1.80E+03	2.10E+03	2.30E+03	2.55E+03	2.78E+03	2.55E+03	2.30E+03
Background	Subsurface Soil	METALS	Silver	mg/kg dw	3	1	33%	3	0.75	0.75	Normal	5.50E-01	8.93E-01	9.80E-01	1.11E+00	2.03E+00	1.11E+00	9.80E-01
Background	Subsurface Soil	METALS	Sodium	mg/kg dw	3	1	33%	3	0.75	0.75	Lognormal	8.00E+01	1.77E+02	4.10E+02	5.17E+02	1.82E+07	1.82E+07	4.10E+02
Background	Subsurface Soil	METALS	Vanadium	mg/kg dw	3	3	100%	3	0.75	0.75	Normal	2.50E+01	2.90E+01	3.10E+01	3.48E+01	3.75E+01	3.48E+01	3.10E+01
Background	Subsurface Soil	METALS	Zinc	mg/kg dw	3	3	100%	3	0.88	0.99	Lognormal	4.20E+01	3.21E+02	7.70E+02	9.83E+02	1.67E+11	1.67E+11	7.70E+02

TABLE
SAMPLES USED IN CALCULATION OF SITE CONCENTRATIONS
Background Subsurface Soil

Area	Medium	Sample	Date Collected	Beginning Depth (ft)	Ending Depth (ft)
Background	Subsurface Soil	BS-EE-04-3-6FT	1/26/00	3	6
Background	Subsurface Soil	BS-EE-20-3-6FT	1/24/00	3	6
Background	Subsurface Soil	BS-EEG-108-3-6FT	1/27/00	3	6

Table
Site Concentration Selection
Background Surface Soil

Area	Medium	Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for Statistics	Shapiro-Wilke's Test for Normality(a)			Summary Statistics			95% Upper Confidence Limit			Site Concentration (c)
									Normal	Lognormal	Dataset Distribution	Minimum	Mean	Maximum	t-Test	H-Test	UCL (b)	
Background	Surface Soil	8280A	1998 Total TEQ w/ EMPC as ND	ppb	3	3	100%	3	0.77	0.87	Lognormal	4.72E-03	6.19E-02	1.72E-01	2.23E-01	9.55E+13	9.55E+13	1.72E-01
Background	Surface Soil	HERB	2,4,5 TP (Silvex)	ug/kg dw	3	3	100%	3	0.97	0.93	Normal	5.80E+00	8.68E+00	1.10E+01	1.31E+01	2.51E+01	1.31E+01	1.10E+01
Background	Surface Soil	VOA	2 Hexanone	ug/kg dw	3	1	33%	3	0.94	0.93	Normal	1.45E+01	1.65E+01	1.80E+01	1.95E+01	2.07E+01	1.95E+01	1.80E+01
Background	Surface Soil	PEST	4,4'-DDE	ug/kg dw	3	1	33%	3	0.76	0.78	Lognormal	2.00E+00	8.08E+00	2.00E+01	2.55E+01	7.22E+07	7.22E+07	2.00E+01
Background	Surface Soil	PEST	4,4'-DDT	ug/kg dw	3	1	33%	3	0.76	0.78	Lognormal	2.00E+00	7.06E+00	1.70E+01	2.18E+01	6.84E+08	6.84E+08	1.70E+01
Background	Surface Soil	METALS	Aluminum	mg/kg dw	3	3	100%	3	0.93	0.97	Lognormal	8.10E+03	1.27E+04	1.90E+04	2.22E+04	7.29E+04	7.29E+04	1.90E+04
Background	Surface Soil	SVOA	Anthracene	ug/kg dw	3	1	33%	1	NC	NC	NC	8.00E+01	8.00E+01	8.00E+01	NC	NC	NC	8.00E+01
Background	Surface Soil	METALS	Antimony	mg/kg dw	1	1	100%	1	NC	NC	NC	1.90E+00	1.90E+00	1.90E+00	NC	NC	NC	1.90E+00
Background	Surface Soil	METALS	Arsenic	mg/kg dw	3	3	100%	3	0.98	1.00	Lognormal	6.60E+00	9.57E+00	1.30E+01	1.50E+01	2.90E+01	2.90E+01	1.30E+01
Background	Surface Soil	METALS	Barium	mg/kg dw	3	3	100%	3	0.94	0.90	Normal	1.10E+02	1.82E+02	2.35E+02	2.90E+02	8.20E+02	2.90E+02	2.35E+02
Background	Surface Soil	SVOA	Benzo(a)anthracene	ug/kg dw	3	2	67%	3	0.98	1.00	Lognormal	7.70E+01	1.20E+02	1.70E+02	1.99E+02	5.25E+02	5.25E+02	1.70E+02
Background	Surface Soil	SVOA	Benzo(a)pyrene	ug/kg dw	3	2	67%	3	0.83	0.87	Lognormal	6.00E+01	9.33E+01	1.50E+02	1.76E+02	8.83E+02	8.83E+02	1.50E+02
Background	Surface Soil	SVOA	Benzo(b)fluoranthene	ug/kg dw	3	2	67%	2	1.00	1.00	Lognormal	6.90E+01	8.95E+01	1.10E+02	2.19E+02	NC	NC	1.10E+02
Background	Surface Soil	SVOA	Benzo(g,h,i)perylene	ug/kg dw	3	2	67%	2	1.00	1.00	Lognormal	4.50E+01	6.35E+01	8.20E+01	1.80E+02	NC	NC	8.20E+01
Background	Surface Soil	SVOA	Benzo(k)fluoranthene	ug/kg dw	3	2	67%	3	0.97	0.93	Normal	6.00E+01	1.04E+02	1.40E+02	1.73E+02	6.42E+02	1.73E+02	1.40E+02
Background	Surface Soil	METALS	Beryllium	mg/kg dw	3	3	100%	3	0.99	1.00	Lognormal	4.50E-01	7.53E-01	1.10E+00	1.30E+00	4.90E+00	4.90E+00	1.10E+00
Background	Surface Soil	SVOA	bis(2 Ethylhexyl)phthalate	ug/kg dw	3	2	67%	3	0.77	0.79	Lognormal	1.05E+02	1.61E+02	2.68E+02	3.17E+02	2.15E+03	2.15E+03	2.68E+02
Background	Surface Soil	METALS	Cadmium	mg/kg dw	3	3	100%	3	0.94	0.98	Lognormal	5.20E-01	4.32E+00	9.40E+00	1.20E+01	2.50E+09	2.50E+09	9.40E+00
Background	Surface Soil	METALS	Calcium	mg/kg dw	3	3	100%	3	0.80	0.89	Lognormal	4.00E+03	1.68E+04	4.00E+04	5.07E+04	1.95E+10	1.95E+10	4.00E+04
Background	Surface Soil	SVOA	Carbazole	ug/kg dw	3	1	33%	1	NC	NC	NC	3.20E+01	3.20E+01	3.20E+01	NC	NC	NC	3.20E+01
Background	Surface Soil	METALS	Chromium	mg/kg dw	3	3	100%	3	0.75	0.75	Lognormal	1.70E+01	1.97E+01	2.50E+01	2.75E+01	3.43E+01	3.43E+01	2.50E+01
Background	Surface Soil	SVOA	Chrysene	ug/kg dw	3	2	67%	3	0.86	0.90	Lognormal	9.70E+01	1.37E+02	2.00E+02	2.30E+02	5.42E+02	5.42E+02	2.00E+02
Background	Surface Soil	METALS	Cobalt	mg/kg dw	3	3	100%	3	0.98	1.00	Lognormal	5.50E+00	7.77E+00	1.04E+01	1.19E+01	2.09E+01	2.09E+01	1.04E+01
Background	Surface Soil	METALS	Copper	mg/kg dw	3	3	100%	3	0.97	1.00	Lognormal	3.50E+01	1.05E+02	1.90E+02	2.37E+02	8.98E+04	8.98E+04	1.90E+02
Background	Surface Soil	SVOA	Diethylphthalate	ug/kg dw	3	3	100%	3	0.75	0.75	Normal	6.00E+01	9.33E+01	1.10E+02	1.42E+02	3.03E+02	1.42E+02	1.10E+02
Background	Surface Soil	SVOA	Di-n-butylphthalate	ug/kg dw	3	2	67%	3	0.85	0.88	Lognormal	1.05E+02	1.58E+02	2.40E+02	2.80E+02	9.51E+02	9.51E+02	2.40E+02
Background	Surface Soil	SVOA	Fluoranthene	ug/kg dw	3	2	67%	3	0.93	0.99	Lognormal	1.13E+02	2.51E+02	4.40E+02	5.37E+02	2.04E+04	2.04E+04	4.40E+02
Background	Surface Soil	METALS	Iron	mg/kg dw	3	3	100%	3	0.89	0.92	Lognormal	1.50E+04	1.90E+04	2.50E+04	2.79E+04	3.95E+04	3.95E+04	2.50E+04
Background	Surface Soil	METALS	Lead	mg/kg dw	3	3	100%	3	0.98	1.00	Lognormal	2.40E+01	9.23E+01	1.80E+02	2.27E+02	1.38E+06	1.38E+06	1.80E+02
Background	Surface Soil	METALS	Magnesium	mg/kg dw	3	3	100%	3	0.88	0.97	Lognormal	3.20E+03	8.62E+03	1.70E+04	2.10E+04	7.47E+06	7.47E+06	1.70E+04
Background	Surface Soil	METALS	Manganese	mg/kg dw	3	3	100%	3	0.80	0.81	Lognormal	3.90E+02	4.42E+02	5.35E+02	5.78E+02	6.57E+02	6.57E+02	5.35E+02
Background	Surface Soil	HERB	MCPA((4-chloro 2-methylphenoxy)-acetic a	ug/kg dw	3	3	100%	3	0.76	0.77	Lognormal	4.30E+03	7.25E+03	1.30E+04	1.56E+04	2.93E+05	2.93E+05	1.30E+04
Background	Surface Soil	HERB	MCPP(2-(4 chloro 2 methylphenoxy) propan	ug/kg dw	3	3	100%	3	0.87	0.83	Normal	2.50E+03	4.98E+03	6.55E+03	8.65E+03	8.87E+04	8.65E+03	6.55E+03
Background	Surface Soil	METALS	Mercury	mg/kg dw	3	3	100%	3	0.99	1.00	Lognormal	4.40E-02	8.87E-02	1.40E-01	1.70E-01	2.06E+00	2.06E+00	1.40E-01
Background	Surface Soil	VOA	Methylene chloride (Dichloromethane)	ug/kg dw	3	2	67%	3	0.87	0.97	Lognormal	1.70E+00	5.69E+00	1.20E+01	1.50E+01	5.83E+04	5.83E+04	1.20E+01
Background	Surface Soil	METALS	Molybdenum	mg/kg dw	3	3	100%	3	0.94	0.97	Lognormal	7.20E-01	1.01E+00	1.40E+00	1.60E+00	3.02E+00	3.02E+00	1.40E+00
Background	Surface Soil	METALS	Nickel	mg/kg dw	3	3	100%	3	1.00	1.00	Normal	1.50E+01	2.13E+01	2.80E+01	3.23E+01	5.54E+01	3.23E+01	2.80E+01
Background	Surface Soil	SVOA	Pentachlorophenol	ug/kg dw	3	2	67%	3	0.65	0.89	Lognormal	2.55E+02	3.71E+02	5.61E+02	6.50E+02	1.90E+03	1.90E+03	5.61E+02
Background	Surface Soil	SVOA	Phenanthrene	ug/kg dw	3	2	67%	3	0.80	0.83	Lognormal	1.00E+02	1.88E+02	2.90E+02	3.47E+02	4.04E+03	4.04E+03	2.90E+02
Background	Surface Soil	METALS	Potassium	mg/kg dw	3	3	100%	3	1.00	0.99	Normal	1.30E+03	2.37E+03	3.50E+03	4.22E+03	2.40E+04	4.22E+03	3.50E+03
Background	Surface Soil	SVOA	Pyrene	ug/kg dw	3	2	67%	3	0.94	0.99	Lognormal	1.13E+02	2.18E+02	3.60E+02	4.33E+02	5.37E+03	5.37E+03	3.60E+02
Background	Surface Soil	METALS	Silver	mg/kg dw	3	2	67%	3	0.97	1.00	Lognormal	3.25E-01	6.75E-01	1.10E+00	1.34E+00	2.20E+01	2.20E+01	1.10E+00
Background	Surface Soil	METALS	Sodium	mg/kg dw	3	1	33%	3	0.77	0.82	Lognormal	5.00E+01	2.88E+02	7.50E+02	9.62E+02	3.67E+11	3.67E+11	7.50E+02
Background	Surface Soil	PCB	Total PCBs	ug/kg dw	3	2	67%	3	0.78	0.99	Lognormal	1.00E+01	6.00E+02	1.71E+03	2.22E+03	1.91E+30	1.91E+30	1.71E+03
Background	Surface Soil	METALS	Vanadium	mg/kg dw	3	3	100%	3	0.88	0.91	Lognormal	2.80E+01	3.45E+01	4.45E+01	4.93E+01	6.53E+01	6.53E+01	4.45E+01
Background	Surface Soil	METALS	Zinc	mg/kg dw	3	3	100%	3	0.95	0.99	Lognormal	8.20E+01	4.04E+02	8.20E+02	1.04E+03	1.23E+08	1.23E+08	8.20E+02

B-29

TABLE
SAMPLES USED IN CALCULATION OF SITE CONCENTRATIONS
Background Surface Soil

Area	Medium	Sample	Date Collected	Beginning Depth (ft)	Ending Depth (ft)
Backgrounc	Surface Soil	BS-EE-04-0-0.5FT	1/26/00	0	0.5
Backgrounc	Surface Soil	BS-EE-20-0-0.5FT	1/24/00	0	0.5
Backgrounc	Surface Soil	BS-EEG-108-0-0.5FT	1/27/00	0	0.5

Table
Site Concentration Selection
Combined Surface Water

Area	Medium	Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for Statistics	Shapiro-Wilke's Test for Normality(a)			Summary Statistics			95% Upper Confidence Limit			Site Concentration (c)
									Normal	Lognormal	Dataset Distribution	Minimum	Mean	Maximum	t-Test	H-Test	UCL (b)	
Combined	Surface Water	8290	1998 Total TEQ w/ EMPC as ND	ug/l	6	6	100%	6	1	1	Lognormal	9.97E-07	2.68E-06	9.01E-06	5.24E-06	9.03E-06	9.03E-06	9.01E-06
Combined	Surface Water	VOA	Acetone	ug/l	6	3	50%	3	0.69	0.91	Lognormal	1.30E+01	1.50E+01	1.60E+01	1.95E+01	2.20E+01	2.20E+01	1.60E+01
Combined	Surface Water	PEST	alpha BHC	ug/l	6	2	33%	2	1.00	1.00	Lognormal	4.70E-04	7.35E-04	1.00E-03	2.41E-03	NC	NC	1.00E-03
Combined	Surface Water	METALS	Aluminum	mg/l	6	6	100%	6	1	1	Lognormal	3.90E-02	9.17E-01	3.40E+00	1.94E+00	9.35E+01	9.35E+01	3.40E+00
Combined	Surface Water	METALS	Arsenic	mg/l	6	5	83%	6	0.92	0.98	Lognormal	3.20E-03	8.00E-03	1.50E-02	1.18E-02	1.60E-02	1.60E-02	1.50E-02
Combined	Surface Water	METALS	Barium	mg/l	6	6	100%	6	0.77	0.88	Lognormal	4.50E-02	1.44E-01	3.20E-01	2.20E-01	3.49E-01	3.49E-01	3.20E-01
Combined	Surface Water	VOA	Benzene	ug/l	6	1	17%	6	0.50	0.50	Lognormal	6.00E-01	7.83E-01	1.70E+00	1.15E+00	1.26E+00	1.26E+00	1.26E+00
Combined	Surface Water	PEST	beta BHC	ug/l	6	3	50%	6	0.77	0.83	Lognormal	7.00E-03	1.04E-02	2.00E-02	1.48E-02	1.69E-02	1.69E-02	1.69E-02
Combined	Surface Water	METALS	Calcium	mg/l	6	6	100%	6	0.66	0.71	Lognormal	4.70E+01	5.82E+01	8.90E+01	7.08E+01	7.24E+01	7.24E+01	7.24E+01
Combined	Surface Water	METALS	Chromium	mg/l	6	1	17%	1	NC	NC	NC	4.10E-03	4.10E-03	4.10E-03	NC	NC	NC	4.10E-03
Combined	Surface Water	METALS	Cobalt	mg/l	6	1	17%	1	NC	NC	NC	1.50E-03	1.50E-03	1.50E-03	NC	NC	NC	1.50E-03
Combined	Surface Water	METALS	Copper	mg/l	6	6	100%	6	0.91	0.98	Lognormal	1.60E-03	5.23E-03	1.20E-02	8.46E-03	1.84E-02	1.84E-02	1.20E-02
Combined	Surface Water	PEST	delta BHC	ug/l	6	2	33%	2	1.00	1.00	Normal	1.30E-04	1.17E-03	2.20E-03	7.70E-03	NC	7.70E-03	2.20E-03
Combined	Surface Water	PEST	Dieldrin	ug/l	6	1	17%	1	NC	NC	NC	1.00E-03	1.00E-03	1.00E-03	NC	NC	NC	1.00E-03
Combined	Surface Water	PEST	Endosulfan I	ug/l	6	2	33%	2	1.00	1.00	Normal	1.50E-03	1.95E-03	2.40E-03	4.79E-03	NC	4.79E-03	2.40E-03
Combined	Surface Water	PEST	Endosulfan sulfate	ug/l	6	1	17%	1	NC	NC	NC	3.20E-03	3.20E-03	3.20E-03	NC	NC	NC	3.20E-03
Combined	Surface Water	PEST	Endrin	ug/l	6	1	17%	1	NC	NC	NC	9.50E-04	9.50E-04	9.50E-04	NC	NC	NC	9.50E-04
Combined	Surface Water	PEST	Endrin aldehyde	ug/l	6	2	33%	2	1.00	1.00	Normal	1.60E-03	2.40E-03	3.20E-03	7.45E-03	NC	7.45E-03	3.20E-03
Combined	Surface Water	PEST	Endrin ketone	ug/l	6	1	17%	1	NC	NC	NC	2.70E-03	2.70E-03	2.70E-03	NC	NC	NC	2.70E-03
Combined	Surface Water	SVOA	Fluoranthene	ug/l	6	1	17%	1	NC	NC	NC	7.00E-01	7.00E-01	7.00E-01	NC	NC	NC	7.00E-01
Combined	Surface Water	OTHER	Fluoride	mg/l	6	6	100%	6	0.88	0.87	Lognormal	2.40E-01	2.58E-01	2.90E-01	2.73E-01	NC	NC	2.90E-01
Combined	Surface Water	PEST	gamma-BHC (Lindane)	ug/l	6	2	33%	2	1.00	1.00	Lognormal	2.40E-03	3.10E-03	3.80E-03	7.52E-03	NC	NC	3.80E-03
Combined	Surface Water	OTHER	Hardness as CaCO3	mg/l	6	6	100%	6	0.84	0.87	Lognormal	2.20E+02	2.72E+02	3.50E+02	3.07E+02	3.12E+02	3.12E+02	3.12E+02
Combined	Surface Water	PEST	Heptachlor	ug/l	6	3	50%	3	0.99	0.99	Normal	2.20E-03	2.57E-03	2.90E-03	3.16E-03	3.45E-03	3.16E-03	2.90E-03
Combined	Surface Water	PEST	Heptachlor epoxide	ug/l	6	2	33%	2	1.00	1.00	Normal	9.00E-04	9.30E-04	9.60E-04	1.12E-03	NC	1.12E-03	9.60E-04
Combined	Surface Water	METALS	Iron	mg/l	6	6	100%	6	1	1	Lognormal	5.00E-01	2.28E+00	8.70E+00	4.89E+00	1.75E+01	1.76E+01	8.70E+00
Combined	Surface Water	METALS	Lead	mg/l	6	5	83%	6	0.57	0.73	Lognormal	2.00E-03	6.65E-03	2.00E-02	1.14E-02	2.30E-02	2.30E-02	2.00E-02
Combined	Surface Water	METALS	Magnesium	mg/l	6	6	100%	6	0.89	0.87	Normal	2.60E+01	3.05E+01	3.30E+01	3.26E+01	NC	3.26E+01	3.26E+01
Combined	Surface Water	METALS	Manganese	mg/l	6	6	100%	6	0.54	0.72	Lognormal	8.20E-02	3.87E-01	1.70E+00	9.17E-01	3.59E+00	3.59E+00	1.70E+00
Combined	Surface Water	METALS	Molybdenum	mg/l	6	3	50%	3	0.99	0.98	Normal	2.80E-03	3.43E-03	4.00E-03	4.45E-03	5.18E-03	4.45E-03	4.00E-03
Combined	Surface Water	METALS	Nickel	mg/l	6	6	100%	6	0.95	0.98	Lognormal	6.90E-03	1.28E-02	2.10E-02	1.68E-02	2.04E-02	2.04E-02	2.04E-02
Combined	Surface Water	OTHER	Ortho Phosphate P	mg/l	6	6	100%	6	0.69	0.93	Lognormal	6.30E-02	2.55E-01	8.30E-01	4.92E-01	1.27E+00	1.27E+00	8.30E-01
Combined	Surface Water	OTHER	pH (7.1-4.2) *	su	6	6	100%	6	0.97	0.96	Normal	7.40E+00	8.47E+00	9.70E+00	9.18E+00	9.27E+00	9.18E+00	9.18E+00
Combined	Surface Water	SVOA	Phenanthrene	ug/l	6	1	17%	1	NC	NC	NC	7.00E-01	7.00E-01	7.00E-01	NC	NC	NC	7.00E-01
Combined	Surface Water	METALS	Potassium	mg/l	6	6	100%	6	0.93	0.90	Normal	5.10E+00	6.58E+00	7.60E+00	7.28E+00	7.45E+00	7.28E+00	7.28E+00
Combined	Surface Water	METALS	Sodium	mg/l	6	6	100%	6	0.78	0.79	Lognormal	2.10E+01	2.18E+01	2.40E+01	2.28E+01	NC	NC	2.40E+01
Combined	Surface Water	OTHER	Suspended Solids	mg/l	6	5	83%	6	0.78	1.00	Lognormal	2.50E+00	4.58E+01	1.60E+02	9.46E+01	3.76E+03	3.76E+03	1.60E+02
Combined	Surface Water	OTHER	Total Dissolved Solids	mg/l	6	6	100%	6	0.86	0.90	Lognormal	2.80E+02	3.58E+02	4.60E+02	4.13E+02	4.22E+02	4.22E+02	4.22E+02
Combined	Surface Water	OTHER	Total Phosphorus	mg/l	6	6	100%	6	0.66	0.86	Lognormal	1.30E-01	3.72E-01	1.20E+00	7.11E-01	1.43E+00	1.43E+00	1.20E+00
Combined	Surface Water	METALS	Vanadium	mg/l	6	4	67%	6	0.84	0.90	Lognormal	3.00E-03	7.18E-03	1.40E-02	1.07E-02	1.55E-02	1.55E-02	1.40E-02
Combined	Surface Water	METALS	Zinc	mg/l	6	6	100%	6	0.97	0.99	Lognormal	7.30E-03	3.49E-02	7.50E-02	5.48E-02	1.48E-01	1.48E-01	7.50E-02

B-31

TABLE
SAMPLES USED IN CALCULATION OF SITE CONCENTRATIONS
Combined Surface Water

Area	Medium	Sample	Date Collected	Beginning Depth (ft)	Ending Depth (ft)
Combined	Surface Water	SW-BPL-S1	10/5/99		
Combined	Surface Water	SW-BPL-S2	10/6/99		
Combined	Surface Water	SW-BPL-S3	10/6/99		
Combined	Surface Water	SW-CSF-S1	10/7/99		
Combined	Surface Water	SW-CSF-S2	10/7/99		
Combined	Surface Water	SW-CSF-S3	10/7/99		

Table
Site Concentration Selection
Combined Sediment

Area	Medium	Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for Statistics	Shapiro-Wilke's Test for Normality(a) Normal	Lognormal	Dataset Distribution	Summary Statistics Minimum	Mean	Maximum	95% Upper Confidence Limit t-Test	H-Test	UCL (b)	Site Concentration (c)
Combined	Sediment	8290	1998 Total TEQ w/ EMPC as ND	ug/kg dw	6	6	100%	6	0.87	0.92	Lognormal	1.34E-02	1.19E-01	3.32E-01	2.21E-01	3.76E+00	3.76E+00	3.32E-01
Combined	Sediment	HERB	2,4-D	ug/kg dw	6	3	50%	4	0.82	0.89	Lognormal	8.80E+00	1.37E+01	2.30E+01	2.12E+01	3.64E+01	3.64E+01	2.30E+01
Combined	Sediment	PEST	4,4'-DDD	ug/kg dw	6	1	17%	1	NC	NC	NC	3.80E+00	3.80E+00	3.80E+00	NC	NC	NC	3.80E+00
Combined	Sediment	PEST	4,4'-DDE	ug/kg dw	6	6	100%	6	0.85	0.96	Lognormal	1.11E+00	4.58E+00	1.10E+01	7.89E+00	2.42E+01	2.42E+01	1.10E+01
Combined	Sediment	PEST	4,4'-DDT	ug/kg dw	6	3	50%	3	0.81	0.86	Lognormal	1.14E+00	2.35E+00	4.50E+00	5.50E+00	3.98E+02	3.98E+02	4.50E+00
Combined	Sediment	PEST	Aldrin	ug/kg dw	6	1	17%	2	1.00	1.00	Normal	3.63E+00	3.81E+00	4.10E+00	5.63E+00	NC	5.63E+00	4.10E+00
Combined	Sediment	PEST	Alpha Chlordane	ug/kg dw	6	6	100%	6	0.90	0.93	Lognormal	4.75E-01	2.60E+00	5.30E+00	4.30E+00	1.97E+01	1.97E+01	5.30E+00
Combined	Sediment	METALS	Aluminum	mg/kg dw	6	6	100%	6	0.94	0.90	Normal	7.80E+03	1.33E+04	1.70E+04	1.61E+04	1.79E+04	1.61E+04	1.61E+04
Combined	Sediment	METALS	Antimony	mg/kg dw	5	4	80%	4	0.87	0.83	Normal	1.50E+00	2.21E+00	2.60E+00	2.79E+00	3.45E+00	2.79E+00	2.60E+00
Combined	Sediment	METALS	Arsenic	mg/kg dw	6	6	100%	6	0.93	0.88	Normal	8.00E+00	1.48E+01	1.90E+01	1.79E+01	2.05E+01	1.79E+01	1.79E+01
Combined	Sediment	METALS	Barium	mg/kg dw	6	6	100%	6	0.95	0.95	Normal	1.60E+02	2.86E+02	4.20E+02	3.68E+02	4.32E+02	3.68E+02	3.68E+02
Combined	Sediment	METALS	Beryllium	mg/kg dw	6	6	100%	6	0.91	0.89	Normal	5.30E-01	7.35E-01	8.90E-01	8.57E-01	9.05E-01	8.57E-01	8.57E-01
Combined	Sediment	METALS	Cadmium	mg/kg dw	6	6	100%	6	0.71	0.93	Lognormal	1.60E+00	1.24E+01	4.70E+01	2.89E+01	3.45E+02	3.45E+02	4.70E+01
Combined	Sediment	METALS	Calcium	mg/kg dw	6	6	100%	6	0.80	0.80	Lognormal	1.10E+04	1.31E+04	1.65E+04	1.62E+04	1.57E+04	1.57E+04	1.57E+04
Combined	Sediment	METALS	Chromium	mg/kg dw	6	6	100%	6	0.92	0.95	Lognormal	1.80E+01	2.63E+01	3.80E+01	3.17E+01	3.41E+01	3.41E+01	3.41E+01
Combined	Sediment	SVOA	Chrysene	ug/kg dw	6	1	17%	1	NC	NC	NC	7.40E+01	7.40E+01	7.40E+01	NC	NC	NC	7.40E+01
Combined	Sediment	METALS	Cobalt	mg/kg dw	6	6	100%	6	0.98	0.95	Normal	6.60E+00	9.38E+00	1.30E+01	1.16E+01	1.31E+01	1.16E+01	1.16E+01
Combined	Sediment	METALS	Copper	mg/kg dw	6	6	100%	6	0.87	0.94	Lognormal	3.60E+01	1.59E+02	4.10E+02	2.79E+02	1.12E+03	1.12E+03	4.10E+02
Combined	Sediment	PEST	delta BHC	ug/kg dw	6	1	17%	1	NC	NC	NC	3.40E-01	3.40E-01	3.40E-01	NC	NC	NC	3.40E-01
Combined	Sediment	PEST	Dieldrin	ug/kg dw	6	4	67%	5	0.74	0.86	Lognormal	2.58E-01	4.01E+00	9.30E+00	8.49E+00	4.31E+03	4.31E+03	9.30E+00
Combined	Sediment	PEST	Endosulfan I	ug/kg dw	6	6	100%	6	0.86	0.97	Lognormal	1.00E+00	2.54E+00	5.70E+00	3.94E+00	6.20E+00	6.20E+00	5.70E+00
Combined	Sediment	PEST	Endosulfan II	ug/kg dw	6	3	50%	4	0.94	0.83	Normal	1.80E+00	5.54E+00	8.10E+00	8.74E+00	6.82E+01	8.74E+00	8.10E+00
Combined	Sediment	PEST	Endosulfan sulfate	ug/kg dw	6	3	50%	3	0.98	1.00	Lognormal	1.40E+00	3.06E+00	4.97E+00	8.09E+00	1.34E+02	1.34E+02	4.97E+00
Combined	Sediment	PEST	Endrin	ug/kg dw	6	2	33%	2	NC	NC	NC	1.70E+00	1.70E+00	1.70E+00	1.70E+00	NC	1.70E+00	1.70E+00
Combined	Sediment	PEST	Endrin aldehyde	ug/kg dw	6	6	100%	6	0.83	0.93	Lognormal	1.20E+00	6.23E+00	1.40E+01	9.49E+00	4.01E+01	4.01E+01	1.40E+01
Combined	Sediment	PEST	Endrin ketone	ug/kg dw	6	4	67%	6	0.88	0.75	Normal	7.15E-01	6.70E+00	1.00E+01	9.76E+00	6.33E+01	9.76E+00	9.76E+00
Combined	Sediment	VOA	Ethylbenzene	ug/kg dw	6	1	17%	2	1.00	1.00	Normal	8.50E+00	9.75E+00	1.10E+01	1.76E+01	NC	1.76E+01	1.10E+01
Combined	Sediment	SVOA	Fluoranthene	ug/kg dw	6	2	33%	2	1.00	1.00	Normal	1.20E+02	1.25E+02	1.30E+02	1.67E+02	NC	1.67E+02	1.30E+02
Combined	Sediment	PEST	Gamma Chlordane	ug/kg dw	6	5	83%	6	0.84	1.00	Lognormal	7.35E-01	5.89E+00	1.70E+01	1.07E+01	6.00E+01	6.00E+01	1.70E+01
Combined	Sediment	PEST	gamma-BHC (Lindane)	ug/kg dw	6	1	17%	1	NC	NC	NC	2.43E+00	2.43E+00	2.43E+00	NC	NC	NC	2.43E+00
Combined	Sediment	PEST	Heptachlor	ug/kg dw	6	1	17%	1	NC	NC	NC	9.30E-01	9.30E-01	9.30E-01	NC	NC	NC	9.30E-01
Combined	Sediment	PEST	Heptachlor epoxide	ug/kg dw	6	3	50%	5	0.87	0.77	Normal	5.10E-01	3.60E+00	6.40E+00	5.68E+00	6.05E+01	5.68E+00	6.40E+00
Combined	Sediment	METALS	Iron	mg/kg dw	6	6	100%	6	0.98	0.94	Normal	1.40E+04	2.73E+04	3.80E+04	3.45E+04	4.08E+04	3.46E+04	3.46E+04
Combined	Sediment	METALS	Lead	mg/kg dw	6	6	100%	6	0.75	0.94	Lognormal	3.40E+01	1.14E+02	3.20E+02	2.01E+02	4.15E+02	4.15E+02	3.20E+02
Combined	Sediment	METALS	Magnesium	mg/kg dw	6	6	100%	6	0.99	1.00	Lognormal	3.60E+03	5.03E+03	6.80E+03	5.97E+03	6.29E+03	6.29E+03	6.29E+03
Combined	Sediment	METALS	Manganese	mg/kg dw	6	6	100%	6	0.92	0.91	Normal	1.70E+02	7.50E+02	1.40E+03	1.18E+03	4.02E+03	1.18E+03	1.18E+03
Combined	Sediment	METALS	Mercury	mg/kg dw	6	6	100%	6	0.78	0.94	Lognormal	1.01E-01	3.70E-01	1.10E+00	6.84E-01	2.06E+00	2.06E+00	1.10E+00
Combined	Sediment	PEST	Methoxychlor	ug/kg dw	6	3	50%	3	0.99	1.00	Lognormal	7.30E+00	1.61E+01	2.40E+01	2.93E+01	4.23E+02	4.23E+02	2.40E+01
Combined	Sediment	METALS	Molybdenum	mg/kg dw	6	6	100%	6	0.65	0.87	Lognormal	3.70E-01	1.16E+00	3.70E+00	2.19E+00	4.17E+00	4.17E+00	3.70E+00
Combined	Sediment	METALS	Nickel	mg/kg dw	6	6	100%	6	0.78	0.94	Lognormal	3.50E+01	1.34E+02	3.90E+02	2.45E+02	6.86E+02	6.86E+02	3.90E+02
Combined	Sediment	METALS	Potassium	mg/kg dw	6	6	100%	6	0.94	0.93	Normal	1.60E+03	2.18E+03	2.90E+03	2.64E+03	2.85E+03	2.64E+03	2.64E+03
Combined	Sediment	METALS	Silver	mg/kg dw	6	1	17%	1	NC	NC	NC	7.90E-01	7.90E-01	7.90E-01	NC	NC	NC	7.90E-01
Combined	Sediment	OTHER	Total Organic Carbon	mg/kg dw	6	6	100%	6	0.79	0.93	Lognormal	3.30E+04	6.43E+04	1.40E+05	9.66E+04	1.22E+05	1.22E+05	1.22E+05
Combined	Sediment	PCB	Total PCBs	ug/kg dw	43	20	47%	43	0.43	0.82	Lognormal	1.00E+01	4.02E+02	6.29E+03	6.63E+02	1.24E+03	1.24E+03	1.24E+03
Combined	Sediment	METALS	Vanadium	mg/kg dw	6	6	100%	6	0.97	0.96	Normal	2.50E+01	3.69E+01	5.10E+01	4.47E+01	4.81E+01	4.47E+01	4.47E+01
Combined	Sediment	METALS	Zinc	mg/kg dw	6	6	100%	6	0.79	0.93	Lognormal	2.50E+02	1.20E+03	3.70E+03	2.29E+03	1.14E+04	1.14E+04	3.70E+03

TABLE
SAMPLES USED IN CALCULATION OF SITE CONCENTRATIONS
Combined Sediment

Area	Medium	Sample	Date Collected	Beginning Depth (ft)	Ending Depth (ft)
Combined	Sediment	BPL-ESED-S1-0.2FT	10/6/99	0	0.2
Combined	Sediment	BPL-ESED-S2-0.2FT	10/7/99	0	0.2
Combined	Sediment	BPL-ESED-S3-0.2FT	10/6/99	0	0.2
Combined	Sediment	FASED-BPL-S1-0-10IN	2/3/00	0	10
Combined	Sediment	FASED-BPL-S2-0-10IN	2/3/00	0	10
Combined	Sediment	FASED-BPL-S3-0-8IN	2/3/00	0	8
Combined	Sediment	FASED-BPL-S4-0-10IN	2/3/00	0	10
Combined	Sediment	FASED-BPL-S5-0-9IN	2/3/00	0	9
Combined	Sediment	FASED-BPL-S6-0-11IN	2/3/00	0	11
Combined	Sediment	FASED-BPL-S7-0-9IN	2/3/00	0	9
Combined	Sediment	FASED-BPL-S8-0-9IN	2/3/00	0	9
Combined	Sediment	FASED-CSF-S10-0-9IN	1/12/00	0	9
Combined	Sediment	FASED-CSF-S11W-0-10IN	1/12/00	0	10
Combined	Sediment	FASED-CSF-S12-0-15IN	1/12/00	0	15
Combined	Sediment	FASED-CSF-S13W-0-15IN	1/12/00	0	15
Combined	Sediment	FASED-CSF-S14W-0-15IN	1/12/00	0	15
Combined	Sediment	FASED-CSF-S15W-0-28IN	1/13/00	0	28
Combined	Sediment	FASED-CSF-S16-0-23IN	1/13/00	0	23
Combined	Sediment	FASED-CSF-S17W-0-16IN	1/13/00	0	16
Combined	Sediment	FASED-CSF-S18E-0-14IN	1/13/00	0	14
Combined	Sediment	FASED-CSF-S19-0-13IN	1/17/00	0	13
Combined	Sediment	FASED-CSF-S1E-0-8IN	1/11/00	0	8
Combined	Sediment	FASED-CSF-S2-0-7IN	1/11/00	0	7
Combined	Sediment	FASED-CSF-S20-0-12IN	1/17/00	0	12
Combined	Sediment	FASED-CSF-S21-0-13IN	1/17/00	0	13
Combined	Sediment	FASED-CSF-S22E-0-20IN	1/17/00	0	20
Combined	Sediment	FASED-CSF-S23-0-15IN	1/17/00	0	15
Combined	Sediment	FASED-CSF-S24W-0-13IN	1/17/00	0	13
Combined	Sediment	FASED-CSF-S25E-0-10IN	1/18/00	0	10
Combined	Sediment	FASED-CSF-S26W-0-13IN	1/18/00	0	13
Combined	Sediment	FASED-CSF-S27E-0-16IN	1/18/00	0	16
Combined	Sediment	FASED-CSF-S28-0-10IN	1/18/00	0	10
Combined	Sediment	FASED-CSF-S29W-0-10IN	1/18/00	0	10
Combined	Sediment	FASED-CSF-S3E-0-6IN	1/11/00	0	6
Combined	Sediment	FASED-CSF-S4-0-7IN	1/11/00	0	7
Combined	Sediment	FASED-CSF-S5W-0-10IN	1/11/00	0	10
Combined	Sediment	FASED-CSF-S6E-0-10IN	1/11/00	0	10
Combined	Sediment	FASED-CSF-S7E-0-11IN	1/11/00	0	11
Combined	Sediment	FASED-CSF-S8-0-15IN	1/12/00	0	15
Combined	Sediment	FASED-CSF-S9-0-11IN	1/12/00	0	11
Combined	Sediment	SED-CSF-S1-0.2FT	10/7/99	0	0.2
Combined	Sediment	SED-CSF-S2-0.2FT	10/7/99	0	0.2
Combined	Sediment	SED-CSF-S3-0.2FT	10/7/99	0	0.2

Table
Site Concentration Selection
T7 Subsurface Soil

Area	Medium	Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for Statistics	Shapiro-Wilke's Test for Normality(a) Normal	Lognormal	Dataset Distribution	Summary Statistics Minimum	Mean	Maximum	95% Upper Confidence Limit t-Test	H-Test	UCL (b)	Site Concentration (c)
T7	Subsurface Soil	8280A	1998 Total TEQ w/ EMPC as ND	ug/kg dw	1	1	100%	1	NC	NC	NC	2.00E-05	2.00E-05	2.00E-05	NC	NC	NC	2.00E-05
T7	Subsurface Soil	VOA	2-Butanone (MEK)	ug/kg dw	9	2	22%	2	1.00	1.00	Normal	7.00E+00	9.50E+00	1.20E+01	2.53E+01	NC	2.53E+01	1.20E+01
T7	Subsurface Soil	PEST	4,4'-DDE	ug/kg dw	9	2	22%	2	1.00	1.00	Lognormal	3.40E-01	1.02E+00	1.70E+00	5.31E+00	NC	NC	1.70E+00
T7	Subsurface Soil	VOA	Acetone	ug/kg dw	9	3	33%	9	0.69	0.78	Lognormal	2.70E+01	8.78E+01	3.10E+02	1.47E+02	2.27E+02	2.27E+02	2.27E+02
T7	Subsurface Soil	METALS	Aluminum	mg/kg dw	9	9	100%	9	0.65	0.80	Lognormal	6.00E+03	9.28E+03	2.20E+04	1.23E+04	1.24E+04	1.24E+04	1.24E+04
T7	Subsurface Soil	METALS	Antimony	mg/kg dw	9	2	22%	2	1.00	1.00	Normal	5.60E-01	5.80E-01	6.00E-01	7.06E-01	NC	7.06E-01	6.00E-01
T7	Subsurface Soil	METALS	Arsenic	mg/kg dw	9	9	100%	9	0.71	0.81	Lognormal	4.50E+00	5.99E+00	1.10E+01	7.23E+00	7.27E+00	7.27E+00	7.27E+00
T7	Subsurface Soil	METALS	Barium	mg/kg dw	9	9	100%	9	0.79	0.82	Lognormal	1.70E+02	2.10E+02	2.90E+02	2.38E+02	2.40E+02	2.40E+02	2.40E+02
T7	Subsurface Soil	VOA	Benzene	ug/kg dw	9	2	22%	5	0.76	0.78	Lognormal	2.50E+00	2.98E+00	3.20E+00	3.28E+00	3.35E+00	3.35E+00	3.20E+00
T7	Subsurface Soil	SVOA	Benzo(a)anthracene	ug/kg dw	9	2	22%	2	1.00	1.00	Lognormal	3.60E+01	3.65E+01	3.70E+01	3.97E+01	NC	NC	3.70E+01
T7	Subsurface Soil	SVOA	Benzo(a)pyrene	ug/kg dw	9	2	22%	2	1.00	1.00	Normal	3.40E+01	3.60E+01	3.80E+01	4.88E+01	NC	4.88E+01	3.80E+01
T7	Subsurface Soil	SVOA	Benzo(b)fluoranthene	ug/kg dw	9	2	22%	2	1.00	1.00	Lognormal	2.80E+01	3.25E+01	3.70E+01	6.09E+01	NC	NC	3.70E+01
T7	Subsurface Soil	SVOA	Benzo(g,h,i)perylene	ug/kg dw	9	2	22%	2	1.00	1.00	Lognormal	3.50E+01	3.55E+01	3.60E+01	3.87E+01	NC	NC	3.60E+01
T7	Subsurface Soil	SVOA	Benzo(k)fluoranthene	ug/kg dw	9	1	11%	1	NC	NC	NC	3.60E+01	3.60E+01	3.60E+01	NC	NC	NC	3.60E+01
T7	Subsurface Soil	METALS	Beryllium	mg/kg dw	9	3	33%	9	0.66	0.82	Lognormal	2.40E-01	4.33E-01	1.20E+00	6.21E-01	6.52E-01	6.52E-01	6.52E-01
T7	Subsurface Soil	SVOA	bis(2-Ethylhexyl)phthalate	ug/kg dw	9	7	78%	9	0.47	0.79	Lognormal	7.50E+01	1.08E+03	7.60E+03	2.61E+03	8.18E+03	8.18E+03	7.60E+03
T7	Subsurface Soil	METALS	Cadmium	mg/kg dw	9	9	100%	9	0.61	0.72	Lognormal	2.65E-01	1.78E+00	7.90E+00	3.54E+00	1.04E+01	1.04E+01	7.90E+00
T7	Subsurface Soil	METALS	Calcium	mg/kg dw	9	9	100%	9	0.90	0.84	Normal	4.70E+03	1.20E+04	1.70E+04	1.48E+04	1.77E+04	1.48E+04	1.48E+04
T7	Subsurface Soil	VOA	Carbon disulfide	ug/kg dw	9	3	33%	9	0.81	0.69	Lognormal	2.70E+00	4.19E+00	7.80E+00	5.16E+00	5.30E+00	5.30E+00	5.30E+00
T7	Subsurface Soil	VOA	Chlorobenzene	ug/kg dw	9	2	22%	9	0.57	0.70	Lognormal	2.70E+00	4.10E+00	1.00E+01	5.50E+00	5.45E+00	5.45E+00	5.45E+00
T7	Subsurface Soil	METALS	Chromium	mg/kg dw	9	9	100%	9	0.65	0.78	Lognormal	1.10E+01	3.35E+01	1.30E+02	5.78E+01	8.37E+01	8.37E+01	8.37E+01
T7	Subsurface Soil	SVOA	Chrysene	ug/kg dw	9	2	22%	2	1.00	1.00	Normal	4.30E+01	4.55E+01	4.80E+01	6.13E+01	NC	6.13E+01	4.80E+01
T7	Subsurface Soil	METALS	Cobalt	mg/kg dw	9	9	100%	9	0.71	0.79	Lognormal	5.10E+00	6.50E+00	1.10E+01	7.62E+00	7.63E+00	7.63E+00	7.63E+00
T7	Subsurface Soil	METALS	Copper	mg/kg dw	9	9	100%	9	0.66	0.83	Lognormal	8.10E+00	1.96E+01	6.20E+01	3.05E+01	3.56E+01	3.56E+01	3.56E+01
T7	Subsurface Soil	SVOA	Di-n-butylphthalate	ug/kg dw	9	6	67%	9	0.88	0.83	Normal	4.55E+01	8.91E+01	1.20E+02	1.06E+02	1.18E+02	1.06E+02	1.06E+02
T7	Subsurface Soil	PEST	Endosulfan sulfate	ug/kg dw	9	2	22%	2	1.00	1.00	Lognormal	3.20E-01	4.45E-01	5.70E-01	1.23E+00	NC	NC	5.70E-01
T7	Subsurface Soil	SVOA	Fluoranthene	ug/kg dw	9	2	22%	2	1.00	1.00	Lognormal	7.80E+01	7.95E+01	8.10E+01	8.90E+01	NC	NC	8.10E+01
T7	Subsurface Soil	METALS	Iron	mg/kg dw	9	9	100%	9	0.66	0.75	Lognormal	1.10E+04	1.39E+04	2.60E+04	1.69E+04	1.70E+04	1.70E+04	1.70E+04
T7	Subsurface Soil	METALS	Lead	mg/kg dw	9	9	100%	9	0.68	0.80	Lognormal	8.00E+00	2.24E+01	7.70E+01	3.64E+01	4.71E+01	4.71E+01	4.71E+01
T7	Subsurface Soil	METALS	Magnesium	mg/kg dw	9	9	100%	9	0.86	0.81	Normal	3.20E+03	5.87E+03	7.10E+03	6.69E+03	7.13E+03	6.69E+03	6.69E+03
T7	Subsurface Soil	METALS	Manganese	mg/kg dw	9	9	100%	9	0.92	0.94	Lognormal	1.50E+02	2.59E+02	4.00E+02	3.01E+02	3.13E+02	3.13E+02	3.13E+02
T7	Subsurface Soil	METALS	Mercury	mg/kg dw	9	8	89%	9	0.60	0.60	Lognormal	1.35E-02	6.20E-02	2.90E-01	1.19E-01	2.06E-01	2.06E-01	2.06E-01
T7	Subsurface Soil	METALS	Molybdenum	mg/kg dw	9	6	67%	9	0.65	0.91	Lognormal	3.30E-01	4.93E-01	7.85E-01	5.95E-01	6.19E-01	6.19E-01	6.19E-01
T7	Subsurface Soil	METALS	Nickel	mg/kg dw	9	9	100%	9	0.75	0.83	Lognormal	1.30E+01	2.07E+01	4.20E+01	2.70E+01	2.84E+01	2.84E+01	2.84E+01
T7	Subsurface Soil	SVOA	Pentachlorophenol	ug/kg dw	9	3	33%	9	0.84	0.85	Lognormal	2.36E+02	2.58E+02	3.01E+02	2.72E+02	NC	NC	3.01E+02
T7	Subsurface Soil	SVOA	Phenanthrene	ug/kg dw	9	2	22%	2	1.00	1.00	Lognormal	3.10E+01	3.65E+01	4.20E+01	7.12E+01	NC	NC	4.20E+01
T7	Subsurface Soil	METALS	Potassium	mg/kg dw	9	9	100%	9	0.67	0.80	Lognormal	1.30E+03	1.88E+03	4.00E+03	2.40E+03	2.41E+03	2.41E+03	2.41E+03
T7	Subsurface Soil	SVOA	Pyrene	ug/kg dw	9	1	11%	1	NC	NC	NC	6.00E+01	6.00E+01	6.00E+01	NC	NC	NC	6.00E+01
T7	Subsurface Soil	METALS	Sodium	mg/kg dw	9	3	33%	9	0.80	0.90	Lognormal	6.00E+01	1.18E+02	2.60E+02	1.57E+02	1.70E+02	1.70E+02	1.70E+02
T7	Subsurface Soil	METALS	Thallium	mg/kg dw	9	1	11%	9	0.82	0.84	Lognormal	5.00E-01	5.74E-01	7.20E-01	6.26E-01	6.30E-01	6.30E-01	6.30E-01
T7	Subsurface Soil	VOA	Toluene	ug/kg dw	9	1	11%	9	0.79	0.86	Lognormal	2.70E+00	3.49E+00	5.40E+00	3.99E+00	4.02E+00	4.02E+00	4.02E+00
T7	Subsurface Soil	PCB	Total PCBs	ug/kg dw	9	1	11%	1	NC	NC	NC	8.40E+00	8.40E+00	8.40E+00	NC	NC	NC	8.40E+00
T7	Subsurface Soil	METALS	Vanadium	mg/kg dw	9	9	100%	9	0.64	0.74	Lognormal	1.90E+01	2.52E+01	5.00E+01	3.12E+01	3.11E+01	3.11E+01	3.11E+01
T7	Subsurface Soil	METALS	Zinc	mg/kg dw	9	9	100%	9	0.59	0.69	Lognormal	4.30E+01	3.79E+02	1.80E+03	7.84E+02	3.41E+03	3.41E+03	1.80E+03

B-35

TABLE
SAMPLES USED IN CALCULATION OF SITE CONCENTRATIONS
T7 Subsurface Soil

Area	Medium	Sample	Date Collected	Beginning Depth (ft)	Ending Depth (ft)
T7	Subsurface Soil	DAS-T7-S1-3-6FT	4/20/00	3	6
T7	Subsurface Soil	DAS-T7-S2-3-6FT	4/20/00	3	6
T7	Subsurface Soil	UAS-T7-S1-3-6FT	11/19/99	3	6
T7	Subsurface Soil	UAS-T7-S2-3-6FT	11/19/99	3	6
T7	Subsurface Soil	UAS-T7-S3-3-6FT	11/19/99	3	6
T7	Subsurface Soil	UAS-T7-S4-3-6FT	11/19/99	3	6
T7	Subsurface Soil	UAS-T7-S5-3-6FT	11/19/99	3	6
T7	Subsurface Soil	UAS-T7-S6-3-6FT	11/19/99	3	6
T7	Subsurface Soil	UAS-T7-S7-3-6FT	11/19/99	3	6

Table
Site Concentration Selection
T6 Subsurface Soil

Area	Medium	Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for Statistics	Shapiro-Wilke's Test for Normality(a): Normal	Lognormal	Dataset Distribution	Summary Statistics: Minimum	Mean	Maximum	95% Upper Confidence Limit: t-Test	H-Test	UCL (b)	Site Concentration (c)
T6	Subsurface Soil	8280A	1998 Total TEQ w/ EMPC as ND	ug/kg dw	2	2	100%	2	1.00	1.00	Normal	8.10E-05	7.84E-04	1.51E-03	5.35E-03	NC	5.35E-03	1.51E-03
T6	Subsurface Soil	VOA	2 Hexanone	ug/kg dw	8	1	13%	1	NC	NC	NC	3.50E+00	3.50E+00	3.50E+00	NC	NC	NC	3.50E+00
T6	Subsurface Soil	SVOA	Acenaphthene	ug/kg dw	8	2	25%	8	0.83	0.77	Normal	4.10E+01	1.00E+02	1.60E+02	1.22E+02	1.39E+02	1.22E+02	1.22E+02
T6	Subsurface Soil	SVOA	Acenaphthylene	ug/kg dw	8	1	13%	1	NC	NC	NC	4.90E+01	4.90E+01	4.90E+01	NC	NC	NC	4.90E+01
T6	Subsurface Soil	VOA	Acetone	ug/kg dw	8	1	13%	7	0.91	0.94	Lognormal	2.40E+01	3.04E+01	4.00E+01	3.42E+01	3.46E+01	3.46E+01	3.46E+01
T6	Subsurface Soil	METALS	Aluminum	mg/kg dw	8	8	100%	8	0.92	0.94	Lognormal	5.50E+03	7.90E+03	1.20E+04	9.40E+03	9.82E+03	9.82E+03	9.82E+03
T6	Subsurface Soil	SVOA	Anthracene	ug/kg dw	8	3	38%	8	0.52	0.64	Lognormal	6.60E+01	1.26E+02	3.60E+02	1.90E+02	1.94E+02	1.94E+02	1.94E+02
T6	Subsurface Soil	METALS	Antimony	mg/kg dw	8	2	25%	8	0.51	0.57	Lognormal	1.05E+00	1.32E+00	2.60E+00	1.67E+00	1.66E+00	1.66E+00	1.66E+00
T6	Subsurface Soil	METALS	Arsenic	mg/kg dw	8	8	100%	8	0.80	0.84	Lognormal	5.50E+00	6.20E+00	7.80E+00	6.68E+00	6.69E+00	6.69E+00	6.69E+00
T6	Subsurface Soil	METALS	Barium	mg/kg dw	8	8	100%	8	0.90	0.91	Lognormal	1.60E+02	1.85E+02	2.20E+02	2.04E+02	NC	NC	2.20E+02
T6	Subsurface Soil	VOA	Benzene	ug/kg dw	8	1	13%	5	0.85	0.83	Normal	2.40E+00	2.77E+00	3.00E+00	2.98E+00	NC	2.98E+00	2.98E+00
T6	Subsurface Soil	SVOA	Benzo(a)anthracene	ug/kg dw	8	4	50%	8	0.62	0.90	Lognormal	3.30E+01	2.25E+02	9.40E+02	4.25E+02	7.98E+02	7.98E+02	7.98E+02
T6	Subsurface Soil	SVOA	Benzo(a)pyrene	ug/kg dw	8	2	25%	8	0.58	0.66	Lognormal	5.00E+01	1.85E+02	8.80E+02	3.80E+02	7.46E+02	7.46E+02	7.46E+02
T6	Subsurface Soil	SVOA	Benzo(b)fluoranthene	ug/kg dw	8	3	38%	8	0.61	0.72	Lognormal	9.50E+01	1.93E+02	6.40E+02	3.19E+02	3.83E+02	3.83E+02	3.83E+02
T6	Subsurface Soil	SVOA	Benzo(g,h,i)perylene	ug/kg dw	8	1	13%	8	0.44	0.48	Lognormal	8.50E+01	1.66E+02	6.30E+02	2.91E+02	3.01E+02	3.01E+02	3.01E+02
T6	Subsurface Soil	SVOA	Benzo(k)fluoranthene	ug/kg dw	8	2	25%	8	0.49	0.61	Lognormal	9.50E+01	2.40E+02	1.10E+03	4.74E+02	5.92E+02	5.92E+02	5.92E+02
T6	Subsurface Soil	METALS	Beryllium	mg/kg dw	8	8	100%	8	0.94	0.94	Lognormal	3.80E-01	4.84E-01	6.30E-01	5.45E-01	5.56E-01	5.56E-01	5.56E-01
T6	Subsurface Soil	SVOA	bis(2-Ethylhexyl)phthalate	ug/kg dw	8	3	38%	8	0.56	0.63	Lognormal	9.50E+01	1.25E+02	2.70E+02	1.65E+02	1.65E+02	1.65E+02	1.65E+02
T6	Subsurface Soil	METALS	Cadmium	mg/kg dw	8	8	100%	8	0.93	0.90	Normal	2.30E-01	5.54E-01	9.60E-01	7.23E-01	9.06E-01	7.23E-01	7.23E-01
T6	Subsurface Soil	METALS	Calcium	mg/kg dw	8	8	100%	8	0.71	0.83	Lognormal	1.40E+04	2.60E+04	6.40E+04	3.72E+04	4.08E+04	4.08E+04	4.08E+04
T6	Subsurface Soil	SVOA	Carbazole	ug/kg dw	8	2	25%	8	0.82	0.76	Normal	3.60E+01	1.01E+02	1.70E+02	1.25E+02	1.50E+02	1.25E+02	1.25E+02
T6	Subsurface Soil	METALS	Chromium	mg/kg dw	8	8	100%	8	0.91	0.91	Lognormal	9.80E+00	1.44E+01	2.10E+01	1.72E+01	1.82E+01	1.82E+01	1.82E+01
T6	Subsurface Soil	SVOA	Chrysene	ug/kg dw	8	4	50%	8	0.60	0.88	Lognormal	4.20E+01	2.52E+02	1.10E+03	4.87E+02	8.81E+02	8.81E+02	8.81E+02
T6	Subsurface Soil	METALS	Cobalt	mg/kg dw	8	8	100%	8	0.85	0.88	Lognormal	5.10E+00	6.31E+00	8.60E+00	7.18E+00	7.29E+00	7.29E+00	7.29E+00
T6	Subsurface Soil	METALS	Copper	mg/kg dw	8	8	100%	8	0.78	0.85	Lognormal	9.40E+00	1.88E+01	3.50E+01	2.58E+01	3.01E+01	3.01E+01	3.01E+01
T6	Subsurface Soil	PEST	delta BHC	ug/kg dw	8	1	13%	1	NC	NC	NC	1.40E-01	1.40E-01	1.40E-01	NC	NC	NC	1.40E-01
T6	Subsurface Soil	SVOA	Dibenzo(a,h)anthracene	ug/kg dw	8	2	25%	8	0.54	0.64	Lognormal	5.00E+01	8.46E+01	2.70E+02	1.36E+02	1.45E+02	1.45E+02	1.45E+02
T6	Subsurface Soil	SVOA	Dibenzofuran	ug/kg dw	8	1	13%	8	0.79	0.80	Lognormal	9.50E+01	1.02E+02	1.20E+02	1.08E+02	NC	NC	1.20E+02
T6	Subsurface Soil	PEST	Endosulfan sulfate	ug/kg dw	8	2	25%	2	1.00	1.00	Normal	4.20E-01	5.00E-01	5.80E-01	1.01E+00	NC	1.01E+00	5.80E-01
T6	Subsurface Soil	SVOA	Fluoranthene	ug/kg dw	8	4	50%	8	0.58	0.78	Lognormal	7.90E+01	4.87E+02	2.50E+03	1.06E+03	3.38E+03	3.38E+03	2.50E+03
T6	Subsurface Soil	SVOA	Fluorene	ug/kg dw	8	2	25%	8	0.75	0.64	Normal	3.60E+01	9.39E+01	1.30E+02	1.11E+02	1.32E+02	1.11E+02	1.11E+02
T6	Subsurface Soil	SVOA	Indeno(1,2,3-cd)pyrene	ug/kg dw	8	3	38%	8	0.49	0.56	Lognormal	9.50E+01	1.64E+02	5.70E+02	2.74E+02	2.88E+02	2.88E+02	2.88E+02
T6	Subsurface Soil	METALS	Iron	mg/kg dw	8	8	100%	8	0.88	0.89	Lognormal	1.20E+04	1.40E+04	1.80E+04	1.55E+04	1.58E+04	1.58E+04	1.58E+04
T6	Subsurface Soil	METALS	Lead	mg/kg dw	8	8	100%	8	0.78	0.84	Lognormal	8.00E+00	7.45E+01	2.40E+02	1.35E+02	1.18E+03	1.18E+03	2.40E+02
T6	Subsurface Soil	METALS	Magnesium	mg/kg dw	8	8	100%	8	0.94	0.92	Normal	4.80E+03	6.10E+03	6.90E+03	6.58E+03	6.66E+03	6.58E+03	6.58E+03
T6	Subsurface Soil	METALS	Manganese	mg/kg dw	8	8	100%	8	0.91	0.91	Lognormal	2.40E+02	3.21E+02	4.00E+02	3.62E+02	3.71E+02	3.71E+02	3.71E+02
T6	Subsurface Soil	HERB	MCPA((4-chloro-2-methylphenoxy)-acetic a	ug/kg dw	8	1	13%	8	0.78	0.81	Lognormal	1.10E+03	1.19E+03	1.40E+03	1.26E+03	NC	NC	1.40E+03
T6	Subsurface Soil	HERB	MCPP	ug/kg dw	8	1	13%	8	0.47	0.50	Lognormal	1.10E+03	1.39E+03	3.00E+03	1.82E+03	1.81E+03	1.81E+03	1.81E+03
T6	Subsurface Soil	METALS	Mercury	mg/kg dw	8	6	75%	8	0.78	0.96	Lognormal	1.10E-02	5.86E-02	1.90E-01	9.73E-02	2.07E-01	2.07E-01	1.90E-01
T6	Subsurface Soil	METALS	Molybdenum	mg/kg dw	8	8	100%	8	0.87	0.93	Lognormal	2.70E-01	6.06E-01	1.10E+00	8.10E-01	9.50E-01	9.50E-01	9.50E-01
T6	Subsurface Soil	SVOA	Naphthalene	ug/kg dw	8	2	25%	2	1.00	1.00	Normal	4.10E+01	4.50E+01	4.90E+01	7.03E+01	NC	7.03E+01	4.90E+01
T6	Subsurface Soil	METALS	Nickel	mg/kg dw	8	8	100%	8	0.86	0.89	Lognormal	1.40E+01	1.71E+01	2.40E+01	1.94E+01	1.97E+01	1.97E+01	1.97E+01
T6	Subsurface Soil	SVOA	Pentachlorophenol	ug/kg dw	8	2	25%	5	0.88	0.88	Lognormal	2.42E+02	2.46E+02	2.51E+02	2.50E+02	NC	NC	2.51E+02
T6	Subsurface Soil	SVOA	Phenanthrene	ug/kg dw	8	4	50%	8	0.57	0.83	Lognormal	5.70E+01	3.82E+02	1.90E+03	8.02E+02	1.95E+03	1.95E+03	1.90E+03
T6	Subsurface Soil	METALS	Potassium	mg/kg dw	8	8	100%	8	0.84	0.87	Lognormal	1.20E+03	1.43E+03	2.00E+03	1.61E+03	1.63E+03	1.63E+03	1.63E+03
T6	Subsurface Soil	SVOA	Pyrene	ug/kg dw	8	3	38%	8	0.57	0.74	Lognormal	9.50E+01	4.59E+02	2.30E+03	9.70E+02	2.50E+03	2.50E+03	2.30E+03
T6	Subsurface Soil	METALS	Sodium	mg/kg dw	8	3	38%	8	0.89	0.84	Normal	6.50E+01	1.06E+02	1.40E+02	1.25E+02	1.35E+02	1.25E+02	1.25E+02
T6	Subsurface Soil	VOA	Toluene	ug/kg dw	8	2	25%	8	0.70	0.79	Lognormal	2.40E+00	3.45E+00	6.60E+00	4.37E+00	4.47E+00	4.47E+00	4.47E+00
T6	Subsurface Soil	PCB	Total PCBs	ug/kg dw	8	1	13%	1	NC	NC	NC	4.30E+00	4.30E+00	4.30E+00	NC	NC	NC	4.30E+00
T6	Subsurface Soil	METALS	Vanadium	mg/kg dw	8	8	100%	8	0.92	0.93	Lognormal	1.60E+01	2.38E+01	3.30E+01	2.74E+01	2.82E+01	2.82E+01	2.82E+01
T6	Subsurface Soil	VOA	Xylenes, Total	ug/kg dw	8	1	13%	8	0.88	0.91	Lognormal	2.40E+00	3.22E+00	4.30E+00	3.67E+00	3.75E+00	3.75E+00	3.75E+00
T6	Subsurface Soil	METALS	Zinc	mg/kg dw	8	8	100%	8	0.90	0.93	Lognormal	3.70E+01	8.28E+01	1.60E+02	1.13E+02	1.41E+02	1.41E+02	1.41E+02

TABLE
SAMPLES USED IN CALCULATION OF SITE CONCENTRATIONS
T6 Subsurface Soil

Area	Medium	Sample	Date Collected	Beginning Depth (ft)	Ending Depth (ft)
T6	Subsurface Soil	DAS-T6-S1-3-6FT	4/20/00	3	6
T6	Subsurface Soil	DAS-T6-S2-3-6FT	4/20/00	3	6
T6	Subsurface Soil	DAS-T6-S3-3-6FT	4/20/00	3	6
T6	Subsurface Soil	UAS-T6-S1-3-6FT	11/18/99	3	6
T6	Subsurface Soil	UAS-T6-S2-3-6FT	11/18/99	3	6
T6	Subsurface Soil	UAS-T6-S3-3-6FT	11/18/99	3	6
T6	Subsurface Soil	UAS-T6-S4-3-6FT	11/18/99	3	6
T6	Subsurface Soil	UAS-T6-S5-3-6FT	11/18/99	3	6

Table
Site Concentration Selection
T5 Subsurface Soil

Area	Medium	Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for Statistics
T5	Subsurface Soil	8280A	1998 Total TEQ w/ EMPC as ND	ug/kg dw	2	2	100%	2
T5	Subsurface Soil	HERB	2,4-DB	ug/kg dw	9	1	11%	9
T5	Subsurface Soil	VOA	2-Butanone (MEK)	ug/kg dw	9	1	11%	1
T5	Subsurface Soil	VOA	Acetone	ug/kg dw	9	1	11%	9
T5	Subsurface Soil	METALS	Aluminum	mg/kg dw	9	9	100%	9
T5	Subsurface Soil	METALS	Arsenic	mg/kg dw	9	9	100%	9
T5	Subsurface Soil	METALS	Barium	mg/kg dw	9	9	100%	9
T5	Subsurface Soil	VOA	Benzene	ug/kg dw	9	1	11%	1
T5	Subsurface Soil	SVOA	Benzo(b)fluoranthene	ug/kg dw	9	1	11%	1
T5	Subsurface Soil	SVOA	Benzo(g,h,i)perylene	ug/kg dw	9	1	11%	1
T5	Subsurface Soil	METALS	Beryllium	mg/kg dw	9	9	100%	9
T5	Subsurface Soil	SVOA	bis(2-Ethylhexyl)phthalate	ug/kg dw	9	5	56%	9
T5	Subsurface Soil	METALS	Cadmium	mg/kg dw	9	9	100%	9
T5	Subsurface Soil	METALS	Calcium	mg/kg dw	9	9	100%	9
T5	Subsurface Soil	METALS	Chromium	mg/kg dw	9	9	100%	9
T5	Subsurface Soil	METALS	Cobalt	mg/kg dw	9	9	100%	9
T5	Subsurface Soil	METALS	Copper	mg/kg dw	9	9	100%	9
T5	Subsurface Soil	SVOA	Dibenzo(a,h)anthracene	ug/kg dw	9	1	11%	9
T5	Subsurface Soil	SVOA	Di-n-octylphthalate	ug/kg dw	9	1	11%	9
T5	Subsurface Soil	SVOA	Indeno(1,2,3-cd)pyrene	ug/kg dw	9	1	11%	9
T5	Subsurface Soil	METALS	Iron	mg/kg dw	9	9	100%	9
T5	Subsurface Soil	METALS	Lead	mg/kg dw	9	9	100%	9
T5	Subsurface Soil	METALS	Magnesium	mg/kg dw	9	9	100%	9
T5	Subsurface Soil	METALS	Manganese	mg/kg dw	9	9	100%	9
T5	Subsurface Soil	HERB	MCPA	ug/kg dw	9	1	11%	9
T5	Subsurface Soil	HERB	MCPP	ug/kg dw	9	2	22%	9
T5	Subsurface Soil	METALS	Mercury	mg/kg dw	9	9	100%	9
T5	Subsurface Soil	METALS	Molybdenum	mg/kg dw	9	8	89%	8
T5	Subsurface Soil	METALS	Nickel	mg/kg dw	9	9	100%	9
T5	Subsurface Soil	METALS	Potassium	mg/kg dw	9	9	100%	9
T5	Subsurface Soil	METALS	Sodium	mg/kg dw	9	3	33%	9
T5	Subsurface Soil	VOA	Toluene	ug/kg dw	9	1	11%	1
T5	Subsurface Soil	METALS	Vanadium	mg/kg dw	9	9	100%	9
T5	Subsurface Soil	METALS	Zinc	mg/kg dw	9	9	100%	9

Constituent	Shapiro-Wilke's Test for Normality(a)			Summary Statistics			95% Upper Confidence Limit			Site Concentration (c)
	Normal	Lognormal	Dataset Distribution	Minimum	Mean	Maximum	t-Test	H-Test	UCL (b)	
1998 Total TEQ w/ EMPC as ND	1.00	1.00	Normal	7.00E-06	2.10E-05	3.50E-05	1.09E-04	NC	1.09E-04	3.50E-05
2,4-DB	0.62	0.68	Lognormal	4.25E+00	4.86E+00	7.70E+00	5.61E+00	5.60E+00	5.60E+00	5.60E+00
2-Butanone (MEK)	NC	NC	NC	1.30E+01	1.30E+01	1.30E+01	NC	NC	NC	1.30E+01
Acetone	0.44	0.52	Lognormal	2.63E+01	4.21E+01	1.40E+02	6.49E+01	6.23E+01	6.23E+01	6.23E+01
Aluminum	0.91	0.95	Lognormal	3.60E+03	5.96E+03	9.60E+03	7.21E+03	7.58E+03	7.58E+03	7.58E+03
Arsenic	0.97	0.98	Lognormal	3.50E+00	4.91E+00	6.40E+00	5.49E+00	5.60E+00	5.60E+00	5.60E+00
Barium	0.89	0.83	Normal	9.30E+01	1.70E+02	2.10E+02	1.94E+02	2.06E+02	1.94E+02	1.94E+02
Benzene	NC	NC	NC	9.80E-01	9.80E-01	9.80E-01	NC	NC	NC	9.80E-01
Benzo(b)fluoranthene	NC	NC	NC	7.50E+01	7.50E+01	7.50E+01	NC	NC	NC	7.50E+01
Benzo(g,h,i)perylene	NC	NC	NC	3.00E+01	3.00E+01	3.00E+01	NC	NC	NC	3.00E+01
Beryllium	0.84	0.86	Lognormal	2.80E-01	3.73E-01	5.60E-01	4.38E-01	4.51E-01	4.51E-01	4.51E-01
bis(2-Ethylhexyl)phthalate	0.91	0.87	Normal	6.50E+01	9.87E+01	1.20E+02	1.09E+02	1.12E+02	1.09E+02	1.09E+02
Cadmium	0.91	0.91	Lognormal	8.40E-02	2.24E-01	3.40E-01	2.83E-01	3.36E-01	3.36E-01	3.36E-01
Calcium	0.91	0.75	Normal	3.50E+03	1.38E+04	1.90E+04	1.68E+04	2.22E+04	1.68E+04	1.68E+04
Chromium	0.93	0.96	Lognormal	7.30E+00	1.20E+01	2.00E+01	1.45E+01	1.53E+01	1.53E+01	1.53E+01
Cobalt	0.92	0.93	Lognormal	3.90E+00	5.03E+00	6.10E+00	5.51E+00	5.57E+00	5.57E+00	5.57E+00
Copper	0.81	0.85	Lognormal	5.70E+00	9.20E+00	1.60E+01	1.17E+01	1.26E+01	1.26E+01	1.26E+01
Dibenzo(a,h)anthracene	0.57	0.63	Lognormal	4.65E+01	5.52E+01	9.45E+01	6.45E+01	6.41E+01	6.41E+01	6.41E+01
Di-n-octylphthalate	0.66	0.66	Lognormal	9.00E+01	9.86E+01	1.18E+02	1.04E+02	NC	NC	1.18E+02
Indeno(1,2,3-cd)pyrene	0.91	0.92	Lognormal	9.00E+01	9.81E+01	1.13E+02	1.03E+02	NC	NC	1.13E+02
Iron	0.91	0.94	Lognormal	8.50E+03	1.10E+04	1.50E+04	1.24E+04	1.26E+04	1.26E+04	1.26E+04
Lead	0.84	0.86	Lognormal	8.20E+00	8.11E+00	1.10E+01	9.31E+00	9.53E+00	9.53E+00	9.53E+00
Magnesium	0.95	0.87	Normal	2.60E+03	5.47E+03	7.40E+03	6.36E+03	6.94E+03	6.36E+03	6.36E+03
Manganese	0.96	0.95	Normal	1.40E+02	2.39E+02	3.20E+02	2.77E+02	2.92E+02	2.77E+02	2.77E+02
MCPA	0.58	0.66	Lognormal	1.00E+03	1.24E+03	2.30E+03	1.50E+03	1.48E+03	1.48E+03	1.48E+03
MCPP	0.61	0.65	Lognormal	1.00E+03	1.49E+03	2.90E+03	1.99E+03	2.09E+03	2.09E+03	2.09E+03
Mercury	0.63	0.84	Lognormal	1.00E-02	2.43E-02	8.60E-02	3.93E-02	4.49E-02	4.49E-02	4.49E-02
Molybdenum	0.93	0.94	Lognormal	1.70E-01	2.97E-01	4.50E-01	3.59E-01	3.88E-01	3.88E-01	3.88E-01
Nickel	0.81	0.81	Normal	1.20E+01	1.39E+01	1.70E+01	1.52E+01	1.53E+01	1.52E+01	1.52E+01
Potassium	0.87	0.90	Lognormal	9.30E+02	1.23E+03	1.80E+03	1.42E+03	1.45E+03	1.45E+03	1.45E+03
Sodium	0.86	0.91	Lognormal	4.40E+01	8.23E+01	1.60E+02	1.07E+02	1.17E+02	1.17E+02	1.17E+02
Toluene	NC	NC	NC	1.80E+00	1.80E+00	1.80E+00	NC	NC	NC	1.80E+00
Vanadium	0.88	0.92	Lognormal	1.30E+01	1.86E+01	2.60E+01	2.15E+01	2.21E+01	2.21E+01	2.21E+01
Zinc	0.83	0.87	Lognormal	3.10E+01	3.98E+01	5.60E+01	4.58E+01	4.66E+01	4.66E+01	4.66E+01

B-39

TABLE
SAMPLES USED IN CALCULATION OF SITE CONCENTRATIONS
T5 Subsurface Soil

Area	Medium	Sample	Date Collected	Beginning Depth (ft)	Ending Depth (ft)
T5	Subsurface Soil	DAS-T5-S1-3-6FT	4/19/00	3	6
T5	Subsurface Soil	DAS-T5-S2-3-6FT	4/19/00	3	6
T5	Subsurface Soil	DAS-T5-S3-3-6FT	4/19/00	3	6
T5	Subsurface Soil	UAS-T5-S1-3-6FT	11/17/99	3	6
T5	Subsurface Soil	UAS-T5-S2-3-6FT	11/17/99	3	6
T5	Subsurface Soil	UAS-T5-S3-3-6FT	11/17/99	3	6
T5	Subsurface Soil	UAS-T5-S4-3-6FT	11/17/99	3	6
T5	Subsurface Soil	UAS-T5-S5-3-6FT	11/17/99	3	6
T5	Subsurface Soil	UAS-T5-S6-3-6FT	11/17/99	3	6

Table
Site Concentration Selection
T4 Subsurface Soil

Area	Medium	Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for Statistics	Shapiro-Wilke's Test for Normality(a) Normal	Lognormal	Dataset Distribution	Summary Statistics Minimum	Mean	Maximum	95% Upper Confidence Limit t-Test	H-Test	UCL (b)	Site Concentration (c)
T4	Subsurface Soil	HERB	2,4,5-TP (Silvex)	ug/kg dw	10	1	10%	1	NC	NC	NC	1.50E+00	1.50E+00	1.50E+00	NC	NC	NC	1.50E+00
T4	Subsurface Soil	VOA	2-Butanone (MEK)	ug/kg dw	10	1	10%	1	NC	NC	NC	5.70E+00	5.70E+00	5.70E+00	NC	NC	NC	5.70E+00
T4	Subsurface Soil	SVOA	2-Methylnaphthalene	ug/kg dw	10	1	10%	10	0.72	0.79	Lognormal	9.00E+01	1.07E+02	1.80E+02	1.18E+02	1.18E+02	1.18E+02	1.18E+02
T4	Subsurface Soil	SVOA	Acenaphthene	ug/kg dw	10	1	10%	10	0.39	0.47	Lognormal	9.00E+01	1.91E+02	1.00E+03	3.55E+02	3.10E+02	3.10E+02	3.10E+02
T4	Subsurface Soil	SVOA	Acenaphthylene	ug/kg dw	10	1	10%	10	0.40	0.49	Lognormal	9.00E+01	1.63E+02	7.20E+02	2.76E+02	2.47E+02	2.47E+02	2.47E+02
T4	Subsurface Soil	VOA	Acetone	ug/kg dw	10	5	50%	10	0.60	0.85	Lognormal	7.20E+00	5.16E+01	2.20E+02	8.79E+01	1.18E+02	1.18E+02	1.18E+02
T4	Subsurface Soil	METALS	Aluminum	mg/kg dw	10	10	100%	10	0.94	0.92	Normal	3.30E+03	6.17E+03	9.00E+03	7.32E+03	7.88E+03	7.32E+03	7.32E+03
T4	Subsurface Soil	SVOA	Anthracene	ug/kg dw	10	2	20%	10	0.37	0.50	Lognormal	5.80E+01	6.27E+02	5.40E+03	1.60E+03	1.64E+03	1.64E+03	1.64E+03
T4	Subsurface Soil	METALS	Arsenic	mg/kg dw	10	10	100%	10	0.89	0.89	Lognormal	3.30E+00	4.82E+00	6.00E+00	5.38E+00	5.51E+00	5.51E+00	5.51E+00
T4	Subsurface Soil	METALS	Barium	mg/kg dw	10	10	100%	10	0.92	0.89	Normal	8.75E+01	1.55E+02	2.10E+02	1.80E+02	1.92E+02	1.80E+02	1.80E+02
T4	Subsurface Soil	SVOA	Benzo(a)anthracene	ug/kg dw	10	4	40%	10	0.37	0.59	Lognormal	3.30E+01	1.28E+03	1.20E+04	3.46E+03	5.90E+03	5.90E+03	5.90E+03
T4	Subsurface Soil	SVOA	Benzo(a)pyrene	ug/kg dw	10	1	10%	10	0.37	0.42	Lognormal	4.73E+01	6.09E+02	5.60E+03	1.63E+03	1.92E+03	1.92E+03	1.92E+03
T4	Subsurface Soil	SVOA	Benzo(b)fluoranthene	ug/kg dw	10	1	10%	10	0.37	0.42	Lognormal	9.00E+01	1.07E+03	9.80E+03	2.85E+03	3.30E+03	3.30E+03	3.30E+03
T4	Subsurface Soil	SVOA	Benzo(g,h,i)perylene	ug/kg dw	10	2	20%	10	0.68	0.76	Lognormal	1.05E+01	1.09E+02	3.30E+02	1.57E+02	2.69E+02	2.69E+02	2.69E+02
T4	Subsurface Soil	SVOA	Benzo(k)fluoranthene	ug/kg dw	10	1	10%	10	0.37	0.42	Lognormal	9.00E+01	7.21E+02	6.30E+03	1.86E+03	1.87E+03	1.87E+03	1.87E+03
T4	Subsurface Soil	METALS	Beryllium	mg/kg dw	10	10	100%	10	0.93	0.91	Normal	1.95E-01	3.72E-01	6.00E-01	4.33E-01	4.61E-01	4.33E-01	4.33E-01
T4	Subsurface Soil	PEST	beta-BHC	ug/kg dw	10	1	10%	1	NC	NC	NC	2.00E-01	2.00E-01	2.00E-01	NC	NC	NC	2.00E-01
T4	Subsurface Soil	SVOA	bis(2-Ethylhexyl)phthalate	ug/kg dw	10	2	20%	10	0.37	0.51	Lognormal	7.00E+01	9.65E+02	8.70E+03	2.54E+03	2.99E+03	2.99E+03	2.99E+03
T4	Subsurface Soil	METALS	Cadmium	mg/kg dw	10	7	70%	10	0.69	0.92	Lognormal	1.30E-01	3.33E-01	1.00E+00	4.78E-01	5.06E-01	5.06E-01	5.06E-01
T4	Subsurface Soil	METALS	Calcium	mg/kg dw	10	10	100%	10	0.50	0.81	Lognormal	6.45E+03	2.43E+04	1.30E+05	4.81E+04	4.96E+04	4.96E+04	4.96E+04
T4	Subsurface Soil	SVOA	Carbazole	ug/kg dw	10	1	10%	10	0.40	0.48	Lognormal	9.00E+01	1.73E+02	8.20E+02	3.04E+02	2.69E+02	2.69E+02	2.69E+02
T4	Subsurface Soil	METALS	Chromium	mg/kg dw	10	10	100%	10	0.97	0.98	Lognormal	6.10E+00	1.22E+01	1.70E+01	1.38E+01	1.41E+01	1.41E+01	1.41E+01
T4	Subsurface Soil	SVOA	Chrysene	ug/kg dw	10	4	40%	10	0.37	0.56	Lognormal	3.90E+01	1.18E+03	1.10E+04	3.18E+03	4.80E+03	4.80E+03	4.80E+03
T4	Subsurface Soil	METALS	Cobalt	mg/kg dw	10	10	100%	10	0.92	0.92	Lognormal	4.20E+00	5.06E+00	6.10E+00	5.47E+00	5.51E+00	5.51E+00	5.51E+00
T4	Subsurface Soil	METALS	Copper	mg/kg dw	10	10	100%	10	0.83	0.98	Lognormal	3.70E+00	1.16E+01	3.00E+01	1.61E+01	1.87E+01	1.87E+01	1.87E+01
T4	Subsurface Soil	PEST	delta BHC	ug/kg dw	10	2	20%	2	1.00	1.00	Lognormal	1.20E-01	1.75E-01	2.30E-01	5.22E-01	NC	NC	2.30E-01
T4	Subsurface Soil	SVOA	Dibenzo(a,h)anthracene	ug/kg dw	10	1	10%	10	0.37	0.44	Lognormal	4.73E+01	2.39E+02	1.90E+03	5.77E+02	5.21E+02	5.21E+02	5.21E+02
T4	Subsurface Soil	SVOA	Dibenzofuran	ug/kg dw	10	1	10%	10	0.39	0.46	Lognormal	9.00E+01	2.01E+02	1.10E+03	3.84E+02	3.33E+02	3.33E+02	3.33E+02
T4	Subsurface Soil	PEST	Dieldrin	ug/kg dw	10	1	10%	1	NC	NC	NC	1.30E+00	1.30E+00	1.30E+00	NC	NC	NC	1.30E+00
T4	Subsurface Soil	PEST	Endosulfan sulfate	ug/kg dw	10	1	10%	1	NC	NC	NC	1.00E+00	1.00E+00	1.00E+00	NC	NC	NC	1.00E+00
T4	Subsurface Soil	PEST	Endrin ketone	ug/kg dw	10	1	10%	1	NC	NC	NC	2.90E-01	2.90E-01	2.90E-01	NC	NC	NC	2.90E-01
T4	Subsurface Soil	SVOA	Fluoranthene	ug/kg dw	10	3	30%	10	0.37	0.50	Lognormal	5.40E+01	2.39E+03	2.30E+04	6.59E+03	1.24E+04	1.24E+04	1.24E+04
T4	Subsurface Soil	SVOA	Fluorene	ug/kg dw	10	1	10%	10	0.38	0.45	Lognormal	9.00E+01	2.91E+02	2.00E+03	6.39E+02	5.50E+02	5.50E+02	5.50E+02
T4	Subsurface Soil	SVOA	Indeno(1,2,3-cd)pyrene	ug/kg dw	10	1	10%	10	0.37	0.43	Lognormal	9.00E+01	4.41E+02	3.50E+03	1.06E+03	9.58E+02	9.58E+02	9.58E+02
T4	Subsurface Soil	METALS	Iron	mg/kg dw	10	10	100%	10	0.96	0.97	Lognormal	7.85E+03	1.13E+04	1.60E+04	1.29E+04	1.32E+04	1.32E+04	1.32E+04
T4	Subsurface Soil	METALS	Lead	mg/kg dw	10	10	100%	10	0.51	0.68	Lognormal	6.40E+00	2.36E+01	1.30E+02	4.61E+01	5.62E+01	5.62E+01	5.62E+01
T4	Subsurface Soil	METALS	Magnesium	mg/kg dw	10	10	100%	10	0.95	0.96	Lognormal	2.90E+03	6.15E+03	1.10E+04	7.59E+03	8.33E+03	8.33E+03	8.33E+03
T4	Subsurface Soil	METALS	Manganese	mg/kg dw	10	10	100%	10	0.92	0.89	Normal	1.35E+02	2.59E+02	3.55E+02	3.06E+02	3.32E+02	3.06E+02	3.06E+02
T4	Subsurface Soil	METALS	Mercury	mg/kg dw	10	8	80%	10	0.86	0.96	Lognormal	5.30E-03	1.54E-02	3.90E-02	2.17E-02	2.69E-02	2.69E-02	2.69E-02
T4	Subsurface Soil	PEST	Methoxychlor	ug/kg dw	10	1	10%	1	NC	NC	NC	7.60E+00	7.60E+00	7.60E+00	NC	NC	NC	7.60E+00
T4	Subsurface Soil	METALS	Molybdenum	mg/kg dw	10	10	100%	10	0.93	0.96	Lognormal	1.70E-01	4.07E-01	7.60E-01	5.13E-01	5.79E-01	5.79E-01	5.79E-01
T4	Subsurface Soil	SVOA	Naphthalene	ug/kg dw	10	1	10%	1	NC	NC	NC	6.40E+01	6.40E+01	6.40E+01	NC	NC	NC	6.40E+01
T4	Subsurface Soil	METALS	Nickel	mg/kg dw	10	10	100%	10	0.91	0.93	Lognormal	1.20E+01	1.43E+01	1.80E+01	1.54E+01	1.54E+01	1.54E+01	1.54E+01
T4	Subsurface Soil	SVOA	Pentachlorophenol	ug/kg dw	10	5	50%	10	0.71	0.77	Lognormal	2.23E+02	3.05E+02	5.53E+02	3.67E+02	3.70E+02	3.70E+02	3.70E+02
T4	Subsurface Soil	SVOA	Phenanthrene	ug/kg dw	10	3	30%	10	0.37	0.53	Lognormal	3.60E+01	1.48E+03	1.40E+04	4.03E+03	6.57E+03	6.57E+03	6.57E+03
T4	Subsurface Soil	METALS	Potassium	mg/kg dw	10	10	100%	10	0.92	0.90	Normal	6.35E+02	1.24E+03	1.70E+03	1.46E+03	1.58E+03	1.46E+03	1.46E+03
T4	Subsurface Soil	SVOA	Pyrene	ug/kg dw	10	3	30%	10	0.37	0.48	Lognormal	5.60E+01	1.89E+03	1.80E+04	5.17E+03	8.35E+03	8.35E+03	8.35E+03
T4	Subsurface Soil	METALS	Sodium	mg/kg dw	10	4	40%	10	0.61	0.85	Lognormal	5.00E+01	1.17E+02	3.80E+02	1.72E+02	1.77E+02	1.77E+02	1.77E+02
T4	Subsurface Soil	VOA	Toluene	ug/kg dw	10	1	10%	10	0.79	0.85	Lognormal	2.45E+00	3.13E+00	4.80E+00	3.53E+00	3.54E+00	3.54E+00	3.54E+00
T4	Subsurface Soil	PCB	Total PCBs	ug/kg dw	10	5	50%	10	0.57	0.63	Lognormal	8.55E+00	1.83E+01	5.39E+01	2.85E+01	3.17E+01	3.17E+01	3.17E+01
T4	Subsurface Soil	METALS	Vanadium	mg/kg dw	10	10	100%	10	0.92	0.92	Normal	1.20E+01	1.93E+01	2.60E+01	2.22E+01	2.32E+01	2.22E+01	2.22E+01
T4	Subsurface Soil	METALS	Zinc	mg/kg dw	10	10	100%	10	0.62	0.79	Lognormal	2.65E+01	5.81E+01	1.90E+02	8.72E+01	9.04E+01	9.04E+01	9.04E+01

B-41

TABLE
SAMPLES USED IN CALCULATION OF SITE CONCENTRATIONS
T4 Subsurface Soil

Area	Medium	Sample	Date Collected	Beginning Depth (ft)	Ending Depth (ft)
T4	Subsurface Soil	DAS-T4-S1-3-6FT	4/19/00	3	6
T4	Subsurface Soil	DAS-T4-S2-3-6FT	4/20/00	3	6
T4	Subsurface Soil	DAS-T4-S3-3-6FT	4/20/00	3	6
T4	Subsurface Soil	UAS-T4-S1-3-6FT	11/17/99	3	6
T4	Subsurface Soil	UAS-T4-S2-3-6FT	11/17/99	3	6
T4	Subsurface Soil	UAS-T4-S3-3-6FT	11/17/99	3	6
T4	Subsurface Soil	UAS-T4-S4-3-6FT	11/17/99	3	6
T4	Subsurface Soil	UAS-T4-S5-3-6FT	11/16/99	3	6
T4	Subsurface Soil	UAS-T4-S6-3-6FT	11/16/99	3	6
T4	Subsurface Soil	UAS-T4-S7-3-6FT	11/17/99	3	6

Table
Site Concentration Selection
T3 Subsurface Soil

Area	Medium	Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for Statistics	Shapiro-Wilke's Test for Normality(a)			Summary Statistics			95% Upper Confidence Limit			Site Concentration (c)
									Normal	Lognormal	Dataset Distribution	Minimum	Mean	Maximum	t-Test	H-Test	UCL (b)	
T3	Subsurface Soil	VOA	2-Butanone (MEK)	ug/kg dw	10	1	10%	10	0.68	0.71	Lognormal	1.50E+01	1.67E+01	2.40E+01	1.84E+01	1.84E+01	1.84E+01	1.84E+01
T3	Subsurface Soil	VOA	Acetone	ug/kg dw	10	1	10%	10	0.41	0.47	Lognormal	2.95E+01	4.65E+01	1.80E+02	7.37E+01	6.71E+01	6.71E+01	6.71E+01
T3	Subsurface Soil	METALS	Aluminum	mg/kg dw	10	10	100%	10	0.91	0.93	Lognormal	2.10E+03	7.35E+03	1.40E+04	9.55E+03	1.18E+04	1.18E+04	1.18E+04
T3	Subsurface Soil	METALS	Antimony	mg/kg dw	10	4	40%	4	0.94	0.94	Normal	6.70E-01	7.91E-01	9.15E-01	9.09E-01	9.52E-01	9.09E-01	9.09E-01
T3	Subsurface Soil	METALS	Arsenic	mg/kg dw	10	10	100%	10	0.96	0.86	Normal	1.90E+00	5.35E+00	8.50E+00	6.38E+00	7.27E+00	6.38E+00	6.38E+00
T3	Subsurface Soil	METALS	Barium	mg/kg dw	10	10	100%	10	0.78	0.60	Normal	4.50E+01	1.84E+02	2.50E+02	2.15E+02	2.73E+02	2.15E+02	2.15E+02
T3	Subsurface Soil	SVOA	Benzo(g,h,i)perylene	ug/kg dw	10	4	40%	10	0.87	0.83	Normal	5.30E+01	9.23E+01	1.10E+02	1.04E+02	1.08E+02	1.04E+02	1.04E+02
T3	Subsurface Soil	METALS	Beryllium	mg/kg dw	10	5	50%	10	0.86	0.96	Lognormal	1.20E-01	3.97E-01	8.90E-01	5.35E-01	6.31E-01	6.31E-01	6.31E-01
T3	Subsurface Soil	SVOA	bis(2-Ethylhexyl)phthalate	ug/kg dw	10	4	40%	10	0.89	0.84	Normal	5.70E+01	9.70E+01	1.20E+02	1.08E+02	1.13E+02	1.08E+02	1.08E+02
T3	Subsurface Soil	METALS	Cadmium	mg/kg dw	10	9	90%	10	0.77	0.88	Lognormal	1.50E-01	2.93E-01	5.70E-01	3.82E-01	4.10E-01	4.10E-01	4.10E-01
T3	Subsurface Soil	METALS	Calcium	mg/kg dw	10	10	100%	10	0.95	0.60	Normal	2.40E+03	1.26E+04	1.90E+04	1.56E+04	2.20E+04	1.56E+04	1.56E+04
T3	Subsurface Soil	METALS	Chromium	mg/kg dw	10	10	100%	10	0.88	0.93	Lognormal	5.60E+00	1.20E+01	2.10E+01	1.49E+01	1.62E+01	1.62E+01	1.62E+01
T3	Subsurface Soil	METALS	Cobalt	mg/kg dw	10	10	100%	10	0.95	0.88	Normal	2.80E+00	5.82E+00	8.10E+00	6.72E+00	7.20E+00	6.72E+00	6.72E+00
T3	Subsurface Soil	METALS	Copper	mg/kg dw	10	10	100%	10	0.95	0.87	Normal	2.80E+00	1.16E+01	1.90E+01	1.48E+01	2.01E+01	1.48E+01	1.48E+01
T3	Subsurface Soil	SVOA	Dibenzo(a,h)anthracene	ug/kg dw	10	1	10%	10	0.72	0.80	Lognormal	4.65E+01	5.74E+01	8.70E+01	6.39E+01	6.38E+01	6.38E+01	6.38E+01
T3	Subsurface Soil	SVOA	Indeno(1,2,3-cd)pyrene	ug/kg dw	10	1	10%	2	1.00	1.00	Normal	9.00E+01	9.10E+01	9.20E+01	9.73E+01	NC	9.73E+01	9.20E+01
T3	Subsurface Soil	METALS	Iron	mg/kg dw	10	10	100%	10	0.93	0.88	Normal	5.00E+03	1.27E+04	1.90E+04	1.52E+04	1.69E+04	1.52E+04	1.52E+04
T3	Subsurface Soil	METALS	Lead	mg/kg dw	10	10	100%	10	0.96	0.97	Lognormal	4.50E+00	9.70E+00	1.70E+01	1.18E+01	1.29E+01	1.29E+01	1.29E+01
T3	Subsurface Soil	METALS	Magnesium	mg/kg dw	10	10	100%	10	0.86	0.69	Normal	1.70E+03	5.87E+03	7.70E+03	6.81E+03	8.18E+03	6.81E+03	6.81E+03
T3	Subsurface Soil	METALS	Manganese	mg/kg dw	10	10	100%	10	0.94	0.92	Normal	9.20E+01	2.89E+02	5.50E+02	3.60E+02	4.18E+02	3.60E+02	3.60E+02
T3	Subsurface Soil	METALS	Mercury	mg/kg dw	10	10	100%	10	0.75	0.93	Lognormal	2.90E-03	2.41E-02	7.80E-02	3.61E-02	5.88E-02	5.88E-02	5.88E-02
T3	Subsurface Soil	METALS	Molybdenum	mg/kg dw	10	10	100%	10	0.69	0.94	Lognormal	2.50E-01	5.29E-01	9.50E-01	6.75E-01	7.52E-01	7.52E-01	7.52E-01
T3	Subsurface Soil	METALS	Nickel	mg/kg dw	10	10	100%	10	0.98	0.94	Normal	7.40E+00	1.50E+01	2.20E+01	1.75E+01	1.87E+01	1.75E+01	1.75E+01
T3	Subsurface Soil	SVOA	Pentachlorophenol	ug/kg dw	10	2	20%	7	0.94	0.93	Normal	2.25E+02	2.50E+02	2.76E+02	2.62E+02	NC	2.62E+02	2.62E+02
T3	Subsurface Soil	METALS	Potassium	mg/kg dw	10	10	100%	10	0.91	0.90	Normal	4.90E+02	1.57E+03	2.70E+03	1.98E+03	2.40E+03	1.98E+03	1.98E+03
T3	Subsurface Soil	METALS	Sodium	mg/kg dw	10	3	30%	10	0.90	0.93	Lognormal	2.40E+01	8.74E+01	1.60E+02	1.14E+02	1.39E+02	1.39E+02	1.39E+02
T3	Subsurface Soil	PCB	Total PCBs	ug/kg dw	10	1	10%	3	0.75	0.75	Lognormal	9.00E+00	9.17E+00	9.50E+00	9.65E+00	NC	NC	9.50E+00
T3	Subsurface Soil	METALS	Vanadium	mg/kg dw	10	10	100%	10	0.95	0.94	Normal	7.70E+00	2.18E+01	3.80E+01	2.87E+01	3.04E+01	2.87E+01	2.87E+01
T3	Subsurface Soil	METALS	Zinc	mg/kg dw	10	10	100%	10	0.59	0.86	Lognormal	2.40E+01	6.73E+01	2.60E+02	1.08E+02	1.14E+02	1.14E+02	1.14E+02

TABLE
SAMPLES USED IN CALCULATION OF SITE CONCENTRATIONS
T3 Subsurface Soil

Area	Medium	Sample	Date Collected	Beginning Depth (ft)	Ending Depth (ft)
T3	Subsurface Soil	DAS-T3-S1-3-6FT	4/19/00	3	6
T3	Subsurface Soil	DAS-T3-S2-3-6FT	4/19/00	3	6
T3	Subsurface Soil	DAS-T3-S3-3-6FT	4/19/00	3	6
T3	Subsurface Soil	UAS-T3-S1-3-6FT	11/15/99	3	6
T3	Subsurface Soil	UAS-T3-S2-3-6FT	11/15/99	3	6
T3	Subsurface Soil	UAS-T3-S3-3-6FT	11/15/99	3	6
T3	Subsurface Soil	UAS-T3-S4-3-6FT	11/15/99	3	6
T3	Subsurface Soil	UAS-T3-S5-3-6FT	11/15/99	3	6
T3	Subsurface Soil	UAS-T3-S6-3-6FT	11/15/99	3	6
T3	Subsurface Soil	UAS-T3-S7-3-6FT	11/15/99	3	6

Table
Site Concentration Selection
T2 Subsurface Soil

Area	Medium	Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for Statistics	Shapiro-Wilke's Test for Normality(a): Normal	Lognormal	Dataset Distribution	Summary Statistics: Minimum	Mean	Maximum	95% Upper Confidence Limit: t-Test	H-Test	UCL (b)	Site Concentration (c)
T2	Subsurface Soil	8280A	1998 Total TEQ w/ EMPC as ND	ug/kg dw	2	2	100%	2	1.00	1.00	Normal	5.00E-02	5.76E-02	6.50E-02	1.05E-01	NC	1.05E-01	6.50E-02
T2	Subsurface Soil	VOA	2-Butanone (MEK)	ug/kg dw	9	1	11%	9	0.90	0.91	Lognormal	1.30E+01	1.70E+01	2.33E+01	1.92E+01	1.96E+01	1.96E+01	1.96E+01
T2	Subsurface Soil	VOA	Acetone	ug/kg dw	9	2	22%	9	0.58	0.72	Lognormal	2.60E+01	3.98E+01	1.07E+02	5.57E+01	5.57E+01	5.57E+01	5.57E+01
T2	Subsurface Soil	METALS	Aluminum	mg/kg dw	9	9	100%	9	0.90	0.95	Lognormal	2.80E+03	5.61E+03	1.10E+04	7.17E+03	7.94E+03	7.94E+03	7.94E+03
T2	Subsurface Soil	METALS	Antimony	mg/kg dw	9	1	11%	1	NC	NC	NC	6.70E-01	6.70E-01	6.70E-01	NC	NC	NC	6.70E-01
T2	Subsurface Soil	METALS	Arsenic	mg/kg dw	9	9	100%	9	0.92	0.95	Lognormal	3.40E+00	4.67E+00	7.00E+00	5.37E+00	5.49E+00	5.49E+00	5.49E+00
T2	Subsurface Soil	METALS	Barium	mg/kg dw	9	9	100%	9	0.94	0.93	Normal	9.95E+01	1.63E+02	2.20E+02	1.90E+02	2.00E+02	1.90E+02	1.90E+02
T2	Subsurface Soil	METALS	Beryllium	mg/kg dw	9	4	44%	9	0.81	0.82	Lognormal	1.85E-01	2.63E-01	3.70E-01	3.12E-01	3.26E-01	3.26E-01	3.26E-01
T2	Subsurface Soil	SVOA	bis(2-Ethylhexyl)phthalate	ug/kg dw	9	5	56%	9	0.84	0.96	Lognormal	4.50E+01	9.23E+01	1.60E+02	1.14E+02	1.24E+02	1.24E+02	1.24E+02
T2	Subsurface Soil	METALS	Cadmium	mg/kg dw	9	9	100%	9	0.91	0.94	Lognormal	1.10E-01	2.01E-01	3.20E-01	2.47E-01	2.66E-01	2.66E-01	2.66E-01
T2	Subsurface Soil	METALS	Calcium	mg/kg dw	9	9	100%	9	0.82	0.79	Normal	4.90E+03	1.16E+04	1.50E+04	1.41E+04	1.65E+04	1.41E+04	1.41E+04
T2	Subsurface Soil	METALS	Chromium	mg/kg dw	9	9	100%	9	0.94	0.97	Lognormal	6.05E+00	9.61E+00	1.50E+01	1.13E+01	1.18E+01	1.18E+01	1.18E+01
T2	Subsurface Soil	METALS	Cobalt	mg/kg dw	9	9	100%	9	0.80	0.88	Lognormal	4.00E+00	5.21E+00	8.30E+00	6.03E+00	6.08E+00	6.08E+00	6.08E+00
T2	Subsurface Soil	METALS	Copper	mg/kg dw	9	9	100%	9	0.95	0.97	Lognormal	3.70E+00	8.64E+00	1.60E+01	1.11E+01	1.30E+01	1.30E+01	1.30E+01
T2	Subsurface Soil	PEST	Dieldrin	ug/kg dw	9	1	11%	1	NC	NC	NC	4.10E-01	4.10E-01	4.10E-01	NC	NC	NC	4.10E-01
T2	Subsurface Soil	METALS	Iron	mg/kg dw	9	9	100%	9	0.89	0.94	Lognormal	7.75E+03	1.05E+04	1.60E+04	1.20E+04	1.22E+04	1.22E+04	1.22E+04
T2	Subsurface Soil	METALS	Lead	mg/kg dw	9	9	100%	9	0.89	0.94	Lognormal	5.25E+00	7.82E+00	1.20E+01	9.25E+00	9.57E+00	9.57E+00	9.57E+00
T2	Subsurface Soil	METALS	Magnesium	mg/kg dw	9	9	100%	9	0.91	0.88	Normal	3.25E+03	5.19E+03	6.80E+03	5.97E+03	6.29E+03	5.97E+03	5.97E+03
T2	Subsurface Soil	METALS	Manganese	mg/kg dw	9	9	100%	9	0.82	0.93	Lognormal	1.40E+02	2.37E+02	4.80E+02	3.02E+02	3.15E+02	3.15E+02	3.15E+02
T2	Subsurface Soil	METALS	Mercury	mg/kg dw	9	6	67%	9	0.76	0.92	Lognormal	5.80E-03	1.24E-02	2.90E-02	1.66E-02	1.77E-02	1.77E-02	1.77E-02
T2	Subsurface Soil	METALS	Molybdenum	mg/kg dw	9	9	100%	9	0.92	0.90	Normal	1.60E-01	4.59E-01	7.70E-01	6.01E-01	7.90E-01	6.01E-01	6.01E-01
T2	Subsurface Soil	METALS	Nickel	mg/kg dw	9	9	100%	9	0.82	0.87	Lognormal	1.00E+01	1.28E+01	2.00E+01	1.48E+01	1.50E+01	1.50E+01	1.50E+01
T2	Subsurface Soil	METALS	Potassium	mg/kg dw	9	9	100%	9	0.91	0.93	Lognormal	5.80E+02	1.18E+03	2.00E+03	1.46E+03	1.63E+03	1.63E+03	1.63E+03
T2	Subsurface Soil	METALS	Selenium	mg/kg dw	9	1	11%	2	1.00	1.00	Lognormal	5.00E-01	5.05E-01	5.10E-01	5.37E-01	NC	NC	5.10E-01
T2	Subsurface Soil	METALS	Thallium	mg/kg dw	9	1	11%	7	0.74	0.73	Normal	5.00E-01	5.38E-01	6.65E-01	5.57E-01	NC	5.57E-01	5.57E-01
T2	Subsurface Soil	METALS	Vanadium	mg/kg dw	9	9	100%	9	0.93	0.98	Lognormal	1.15E+01	1.77E+01	2.80E+01	2.10E+01	2.18E+01	2.18E+01	2.18E+01
T2	Subsurface Soil	METALS	Zinc	mg/kg dw	9	9	100%	9	0.93	0.96	Lognormal	2.35E+01	3.69E+01	5.70E+01	4.38E+01	4.58E+01	4.58E+01	4.58E+01

TABLE
SAMPLES USED IN CALCULATION OF SITE CONCENTRATIONS
T2 Subsurface Soil

Area	Medium	Sample	Date Collected	Beginning Depth (ft)	Ending Depth (ft)
T2	Subsurface Soil	DAS-T2-S1-3-6FT	4/18/00	3	6
T2	Subsurface Soil	DAS-T2-S2-3-6FT	4/18/00	3	6
T2	Subsurface Soil	DAS-T2-S3-3-6FT	4/18/00	3	6
T2	Subsurface Soil	UAS-T2-S1-3-6FT	11/12/99	3	6
T2	Subsurface Soil	UAS-T2-S2-3-6FT	11/12/99	3	6
T2	Subsurface Soil	UAS-T2-S3-3-6FT	11/12/99	3	6
T2	Subsurface Soil	UAS-T2-S4-3-6FT	11/12/99	3	6
T2	Subsurface Soil	UAS-T2-S5-3-6FT	11/12/99	3	6
T2	Subsurface Soil	UAS-T2-S6-3-6FT	11/12/99	3	6

Table
Site Concentration Selection
T1 Subsurface Soil

Area	Medium	Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for Statistics	Shapiro-Wilke's Test for Normality(a)			Summary Statistics			95% Upper Confidence Limit			Site Concentration (c)
									Normal	Lognormal	Dataset Distribution	Minimum	Mean	Maximum	t-Test	H-Test	UCL (b)	
T1	Subsurface Soil	8280A	1998 Total TEQ w/ EMPC as ND	ug/kg dw	3	3	100%	3	0 75	0 75	Lognormal	1 00E-05	1 33E-05	2 00E-05	2 31E-05	5 98E-05	5 98E-05	2 00E-05
T1	Subsurface Soil	VOA	2-Butanone (MEK)	ug/kg dw	10	1	10%	10	0 83	0 88	Lognormal	1 20E+01	1 71E+01	2 50E+01	1 98E+01	1 98E+01	1 98E+01	1 98E+01
T1	Subsurface Soil	PEST	4,4' DDD	ug/kg dw	10	1	10%	1	NC	NC	NC	5 30E-01	5 30E-01	5 30E-01	NC	NC	NC	5 30E-01
T1	Subsurface Soil	PEST	4,4' DDE	ug/kg dw	10	2	20%	2	[illegible]	1 00	Lognormal	1 40E-01	1 80E-01	2 20E-01	4 33E-01	NC	NC	2 20E-01
T1	Subsurface Soil	PEST	4,4' DDT	ug/kg dw	10	1	10%	1	[illegible]	NC	NC	2 70E-01	2 70E-01	2 70E-01	NC	NC	NC	2 70E-01
T1	Subsurface Soil	VOA	Acolono	ug/kg dw	10	1	10%	10	0 45	0 60	Lognormal	2 40E+01	5 34E+01	2 40E+02	9 16E+01	8 42E+01	8 42E+01	8 42E+01
T1	Subsurface Soil	PEST	Alpha Chlordane	ug/kg dw	10	1	10%	1	NC	NC	NC	5 80E-01	5 80E-01	5 80E-01	NC	NC	NC	5 80E-01
T1	Subsurface Soil	METALS	Aluminum	mg/kg dw	10	10	100%	10	0 82	0 94	Lognormal	3 50E+03	7 38E+03	1 70E+04	9 78E+03	1 07E+04	1 07E+04	1 07E+04
T1	Subsurface Soil	METALS	Antimony	mg/kg dw	10	5	50%	5	0 92	0 93	Lognormal	5 90E-01	6 88E-01	8 40E-01	7 83E-01	8 01E-01	8 01E-01	8 01E-01
T1	Subsurface Soil	METALS	Arsenic	mg/kg dw	10	10	100%	10	0 69	0 83	Lognormal	3 80E+00	5 87E+00	8 70E+00	6 83E+00	7 07E+00	7 07E+00	7 07E+00
T1	Subsurface Soil	METALS	Barium	mg/kg dw	10	10	100%	10	0 93	0 95	Lognormal	1 20E+02	1 85E+02	2 60E+02	2 13E+02	2 20E+02	2 20E+02	2 20E+02
T1	Subsurface Soil	METALS	Beryllium	mg/kg dw	10	10	100%	10	0 86	0 93	Lognormal	2 40E-01	4 59E-01	9 30E-01	5 86E-01	6 32E-01	6 32E-01	6 32E-01
T1	Subsurface Soil	SVOA	bis(2-Ethylhexyl)phthalate	ug/kg dw	10	2	20%	10	0 88	0 91	Lognormal	6 90E+01	1 02E+02	1 50E+02	1 14E+02	1 16E+02	1 16E+02	1 16E+02
T1	Subsurface Soil	METALS	Cadmium	mg/kg dw	10	9	90%	10	0 95	0 96	Lognormal	1 00E-01	2 78E-01	5 30E-01	3 57E-01	4 24E-01	4 24E-01	4 24E-01
T1	Subsurface Soil	METALS	Calcium	mg/kg dw	10	10	100%	10	0 92	0 90	Normal	8 20E+03	1 29E+04	1 80E+04	1 52E+04	1 65E+04	1 52E+04	1 52E+04
T1	Subsurface Soil	METALS	Chromium	mg/kg dw	10	10	100%	10	0 84	0 95	Lognormal	6 50E+00	1 25E+01	2 50E+01	1 57E+01	1 65E+01	1 65E+01	1 65E+01
T1	Subsurface Soil	METALS	Cobalt	mg/kg dw	10	10	100%	10	0 77	0 86	Lognormal	4 10E+00	5 98E+00	1 10E+01	7 22E+00	7 33E+00	7 33E+00	7 33E+00
T1	Subsurface Soil	METALS	Copper	mg/kg dw	10	10	100%	10	0 96	0 94	Normal	4 00E+00	1 29E+01	2 40E+01	1 66E+01	2 10E+01	1 66E+01	1 66E+01
T1	Subsurface Soil	HERB	Dicamba	ug/kg dw	10	1	10%	1	NC	NC	NC	1 30E+00	1 30E+00	1 30E+00	NC	NC	NC	1 30E+00
T1	Subsurface Soil	PEST	Dieldrin	ug/kg dw	10	2	20%	2	1 00	1 00	Lognormal	1 20E-01	6 60E-01	1 20E+00	4 07E+00	NC	NC	1 20E+00
T1	Subsurface Soil	PEST	Endrin ketone	ug/kg dw	10	2	20%	2	1 00	1 00	Lognormal	1 80E-01	2 25E-01	2 70E-01	5 09E-01	NC	NC	2 70E-01
T1	Subsurface Soil	PEST	Heptachlor	ug/kg dw	10	1	10%	1	NC	NC	NC	2 60E-01	2 60E-01	2 60E-01	NC	NC	NC	2 60E-01
T1	Subsurface Soil	PEST	Heptachlor epoxide	ug/kg dw	10	3	30%	3	0 99	0 90	Normal	5 70E-02	3 26E-01	5 70E-01	7 60E-01	3 78E+05	7 60E-01	5 70E-01
T1	Subsurface Soil	METALS	Iron	mg/kg dw	10	10	100%	10	0 84	0 91	Lognormal	8 30E+03	1 28E+04	2 20E+04	1 54E+04	1 58E+04	1 58E+04	1 58E+04
T1	Subsurface Soil	METALS	Lead	mg/kg dw	10	10	100%	10	0 94	0 95	Lognormal	5 40E+00	8 53E+00	1 50E+01	1 14E+01	1 22E+01	1 22E+01	1 22E+01
T1	Subsurface Soil	METALS	Magnosum	mg/kg dw	10	10	100%	10	0 92	0 92	Lognormal	4 10E+03	5 80E+03	8 30E+03	6 78E+03	6 99E+03	6 99E+03	6 99E+03
T1	Subsurface Soil	METALS	Manganese	mg/kg dw	10	10	100%	10	0 72	0 89	Lognormal	1 70E+02	3 57E+02	9 80E+02	4 98E+02	5 29E+02	5 29E+02	5 29E+02
T1	Subsurface Soil	HERB	MCPA((4 chloro-2-methylphenoxy)-acetic a	ug/kg dw	10	1	10%	10	0 72	0 77	Lognormal	1 10E+03	1 24E+03	1 70E+03	1 34E+03	1 34E+03	1 34E+03	1 34E+03
T1	Subsurface Soil	METALS	Mercury	mg/kg dw	10	7	70%	10	0 81	0 97	Lognormal	4 40E-03	2 18E-02	7 00E-02	3 34E-02	5 20E-02	5 20E-02	5 20E-02
T1	Subsurface Soil	PEST	Methoxychlor	ug/kg dw	10	2	20%	2	1 00	1 00	Normal	1 60E+00	2 10E+00	2 60E+00	5 26E+00	NC	5 26E+00	2 60E+00
T1	Subsurface Soil	VOA	Methylene chloride (Dichloromethane)	ug/kg dw	10	1	10%	2	NC	NC	NC	2 40E+00	2 40E+00	2 40E+00	2 40E+00	NC	2 40E+00	2 40E+00
T1	Subsurface Soil	METALS	Molybdenum	mg/kg dw	10	10	100%	10	0 93	0 97	Lognormal	2 00E-01	3 98E-01	7 60E-01	4 97E-01	5 40E-01	5 40E-01	5 40E-01
T1	Subsurface Soil	METALS	Nickel	mg/kg dw	10	10	100%	10	0 73	0 82	Lognormal	1 10E+01	1 63E+01	3 30E+01	2 02E+01	2 04E+01	2 04E+01	2 04E+01
T1	Subsurface Soil	METALS	Potassium	mg/kg dw	10	10	100%	10	0 86	0 93	Lognormal	7 50E+02	1 42E+03	2 70E+03	1 80E+03	1 95E+03	1 95E+03	1 95E+03
T1	Subsurface Soil	PCB	Total PCBs	ug/kg dw	10	3	30%	10	0 66	0 75	Lognormal	9 00E+00	1 10E+01	1 90E+01	1 27E+01	1 27E+01	1 27E+01	1 27E+01
T1	Subsurface Soil	VOA	Trichloroethene	ug/kg dw	10	3	30%	10	0 65	0 73	Lognormal	2 80E+00	3 70E+00	7 40E+00	4 54E+00	4 53E+00	4 53E+00	4 53E+00
T1	Subsurface Soil	METALS	Vanadium	mg/kg dw	10	10	100%	10	0 84	0 94	Lognormal	1 20E+01	2 24E+01	4 50E+01	2 83E+01	2 97E+01	2 97E+01	2 97E+01
T1	Subsurface Soil	METALS	Zinc	mg/kg dw	10	10	100%	10	0 58	0 85	Lognormal	2 50E+01	6 52E+01	2 50E+02	1 04E+02	1 08E+02	1 08E+02	1 08E+02

TABLE
SAMPLES USED IN CALCULATION OF SITE CONCENTRATIONS
T1 Subsurface Soil

Area	Medium	Sample	Date Collected	Beginning Depth (ft)	Ending Depth (ft)
T1	Subsurface Soil	DAS-T1-S1-3-6FT	4/18/00	3	6
T1	Subsurface Soil	DAS-T1-S2-3-6FT	4/18/00	3	6
T1	Subsurface Soil	DAS-T1-S3-3-6FT	4/18/00	3	6
T1	Subsurface Soil	UAS-T1-S1-3-6FT	11/10/99	3	6
T1	Subsurface Soil	UAS-T1-S2-3-6FT	11/10/99	3	6
T1	Subsurface Soil	UAS-T1-S3-3-6FT	11/11/99	3	6
T1	Subsurface Soil	UAS-T1-S4-3-6FT	11/11/99	3	6
T1	Subsurface Soil	UAS-T1-S5-3-6FT	11/11/99	3	6
T1	Subsurface Soil	UAS-T1-S6-3-6FT	11/11/99	3	6
T1	Subsurface Soil	UAS-T1-S7-3-6FT	11/11/99	3	6

APPENDIX C

SCREENING VALUES

APPENDIX C
SCREENING VALUES

This appendix presents the screening values used to identify constituents of potential concern (COPC) in each area/medium evaluated in the risk assessment. The Tier 1 lookup tables in the Illinois Tiered Approach to Corrective Action Objectives (TACO) program (IEPA, 1998) serve as the basis for the screening values presented in this appendix. The sources and selection of the screening values are discussed in detail in the text in Section 3.0. The screening value tables include the following:

- Table C-1 Residential Soil - Direct Contact Screening Values
- Table C-2 Industrial Soil - Direct Contact Screening Values
- Table C-3 Soil to Groundwater Standards
- Table C-4 Groundwater and Surface Water Standards
- Table C-5 Screening Criteria for Constituents Detected in Air
- Table C-6 Fish Tissue Standards
- Table C-7 Calculation of TACO Tier 1 Standards for Beryllium

The as-published TACO values are presented in Appendix (Workplan) B of Appendix A of this report.

The TACO Values Used for Screening Groundwater and Surface Water

The following rationale for the development of the TACO Groundwater Remediation Objectives was provided via e-mail correspondence with Thomas Hornshaw of the Illinois Environmental Protection Agency (IEPA). All of the Class I standards except lead and copper (one-half the drinking water Action Level), iron, manganese, and fluoride (existing standards), and chloride, sulfate, and dissolved solids (95th percentile) were from MCLs. In development of the Class II Groundwater Remediation Objectives, two different approaches were used, one for organic chemicals and one for inorganics. For the organic chemicals, the intent was to assure that the level of a contaminant in groundwater would not be so high that the groundwater could not be returned to potable quality using routine water treatment procedures (primarily activated carbon and air stripping). A review of the Federal Register notices announcing the various Final Maximum Contaminant Levels for drinking water was conducted in order to determine the potential for removal and the removal efficiency for those chemicals for which the Agency was proposing Class I standards. IEPA determined that for all but a few chemicals (ethylbenzene, toluene, xylene) the removal efficiency was at least 80%; therefore, the Class II standard was set at 5 times the Class I standard (i.e., 80% removal of the chemical by routine treatment methods would result in a final water concentration at or below the Class I standard). For the three chemicals noted above, the Class II standard was set at a lesser multiple of the Class I standard, based on the removal efficiency reported in the Federal Register Notice. The IEPA has amended the original groundwater standard rule by adding several chemicals;

the review of these chemicals' treatment potentials found at least 90% removal efficiency for all added organics, therefore, the Class II standards for these chemicals were set at 10 times the Class I standard.

Regarding the inorganics, the intent was to assure that the concentration in groundwater would not be so high that the water could not be safely used for agricultural purposes (crop irrigation and livestock watering). A search for upper limits on water concentrations which are acceptable for long-term agricultural use was conducted for the chemicals for which Class I standards were being proposed. For most chemicals, the appropriate concentration was found in USEPA's Water Quality Criteria 1972 (the "Blue Book"). Exceptions included cyanide (for which the Agency developed the equivalent of the Blue Book concentration after reviewing relevant papers in the scientific literature), fluoride and iron (for which pre-existing standards were incorporated into the proposal), and chloride, sulfate, and total dissolved solids (for which the 95th percentile of state-wide monitoring data was the proposed concentration).

Calculation of TACO Tier 1 Standards for Beryllium

The USEPA updated its Integrated Risk Information System (IRIS) (USEPA, 2000) file for beryllium on 4/3/2000. The dose-response values changed significantly for beryllium. The most significant change is that beryllium is no longer considered carcinogenic by the oral route of exposure. Therefore, TACO Tier 1 objectives for Residential and Industrial Soil - Direct Contact were recalculated for beryllium using these current dose-response values, and following the TACO Section 742, Appendix C. Table A: SSL Equations and Table B: SSL Parameters guidance. Table C-7 here presents the equations, parameters, and calculations used to provide the updated TACO values for beryllium.

References

IEPA. 1998. Tiered Approach to Corrective Action Objectives. Title 35, Subtitle G, Chapter I, Subchapter J, Part 742. As amended June 8, 1998. Illinois Environmental Protection Agency.

USEPA. 2000. USEPA. 2000. Integrated Risk Information System (IRIS).

[URL: http://www.epa.gov/ngispgm3/iris/]

CAS Number	Constituent	Units	Exposure Route-Specific Values for Soils (a) Ingestion	Inhalation	Selected (Lowest) Value
83-32-9	Acenaphthene	ug/kg	4700000	ND	4700000
67-64-1	Acetone	ug/kg	7800000	100000000	7800000
15972-60-8	Alachlor	ug/kg	8000	ND	8000
116-06-3	Aldicarb	ug/kg	78000	ND	78000
309-00-2	Aldrin	ug/kg	40	3000	40
120-12-7	Anthracene	ug/kg	23000000	ND	23000000
1912-24-9	Atrazine	ug/kg	2700000	ND	2700000
71-43-2	Benzene	ug/kg	22000	800	800
56-55-3	Benzo(a)anthracene	ug/kg	900	ND	900
205-99-2	Benzo(b)fluoranthene	ug/kg	900	ND	900
207-08-9	Benzo(k)fluroanthene	ug/kg	9000	ND	9000
50-32-8	Benzo(a)pyrene	ug/kg	90	ND	90
111-44-4	Bis(2-chloroethyl)ether	ug/kg	600	200	200
117-81-7	Bis(2-ethylhexyl)phthalate	ug/kg	46000	31000000	46000
75-27-4	Bromodichloromethane	ug/kg	10000	3000000	10000
75-25-2	Bromoform	ug/kg	81000	53000	53000
71-36-3	Butanol	ug/kg	7800000	10000000	7800000
85-68-7	Butyl benzyl phthalate	ug/kg	16000000	930000	930000
86-74-8	Carbazole	ug/kg	32000	ND	32000
1563-66-2	Carbofuran	ug/kg	390000	ND	390000
75-15-0	*Carbon disulfide*	*ug/kg*	*7800000*	*720000*	*720000*
56-23-5	Carbon tetrachloride	ug/kg	5000	300	300
57-74-9	Chlordane	ug/kg	500	20000	500
106-47-8	4-Chloroaniline (p-Chloroaniline)	ug/kg	310000	ND	310000
108-90-7	Chlorobenzene (Monochlorobenzene)	ug/kg	1600000	130000	130000
124-48-1	Chlorodibromomethane	ug/kg	1600000	1300000	1300000
67-66-3	Chloroform	ug/kg	100000	300	300
218-01-9	Chrysene	ug/kg	88000	ND	88000
94-75-7	24-D	ug/kg	780000	ND	780000
75-99-0	Dalapon	ug/kg	2300000	ND	2300000
72-54-8	DDD	ug/kg	3000	ND	3000
72-55-9	DDE	ug/kg	2000	ND	2000
50-29-3	DDT	ug/kg	2000	ND	2000
53-70-3	Dibenzo(ah)anthracene	ug/kg	90	ND	90
96-12-8	12-Dibromo-3 chloropropane	ug/kg	460	11000	460
106-93-4	12-Dibromoethane (Ethylene dibromide)	ug/kg	7.5	170	7.5
84-74-2	Di-n-butyl phthalate	ug/kg	7800000	2300000	2300000
95-50-1	12-Dichlorobenzene (o - Dichlorobenzene)	ug/kg	7000000	560000	560000
106-46-7	14-Dichlorobenzene (p - Dichlorobenzene)	ug/kg	ND	ND	NA
91-94-1	33'-Dichlorobenzidine	ug/kg	1000	ND	1000
75-34-3	11-Dichloroethane	ug/kg	7800000	1300000	1300000
107-06-2	12-Dichloroethane (Ethylene dichloride)	ug/kg	7000	400	400
75-35-4	11-Dichloroethylene	ug/kg	700000	1500000	700000
156-59-2	cis-12-Dichloroethylene	ug/kg	780000	1200000	780000
156-60-5	trans-12 Dichloroethylene	ug/kg	1600000	3100000	1600000
78-87-5	12-Dichloropropane	ug/kg	9000	15000	9000
542-75-6	13-Dichloropropene	ug/kg	4000	100	100
60-57-1	Dieldrin	ug/kg	40	1000	40
84-66-2	Diethyl phthalate	ug/kg	63000000	2000000	2000000
105-67-9	24-Dimethylphenol	ug/kg	1600000	ND	1600000
121-14-2	24-Dinitrotoluene	ug/kg	900	ND	900
606-20-2	26-Dinitrotoluene	ug/kg	900	ND	900
117-84-0	Di-n-octyl phthalate	ug/kg	1600000	10000000	1600000
115-29-7	Endosulfan	ug/kg	470000	ND	470000
145-73-3	Endothall	ug/kg	1600000	ND	1600000
72-20-8	Endrin	ug/kg	23000	ND	23000

CAS Number	Constituent	Units	Exposure Route-Specific Values for Soils (a) Ingestion	Inhalation	Selected (Lowest) Value
100-41-4	Ethylbenzene	ug/kg	7800000	400000	400000
206-44-0	Fluoranthene	ug/kg	3100000	ND	3100000
86-73-7	Fluorene	ug/kg	3100000	ND	3100000
76-44-8	Heptachlor	ug/kg	100	100	100
1024-57-3	Heptachlor epoxide	ug/kg	70	5000	70
118-74-1	Hexachlorobenzene	ug/kg	400	1000	400
319-84-6	alpha-HCH (alpha-BHC)	ug/kg	100	800	100
58-89-9	gamma-HCH (Lindane)	ug/kg	500	ND	500
77-47-4	Hexachlorocyclopentadiene	ug/kg	550000	10000	10000
67-72-1	Hexachloroethane	ug/kg	78000	ND	78000
193-39-5	Indeno(123-cd)pyrene	ug/kg	900	ND	900
78-59-1	Isophorone	ug/kg	15600000	4600000	4600000
72-43-5	Methoxychlor	ug/kg	390000	ND	390000
74-83-9	Methyl bromide (Bromomethane)	ug/kg	110000	10000	10000
75-09-2	Methylene chloride (Dichloromethane)	ug/kg	85000	13000	13000
95-48-7	2-Methylphenol (o - Cresol)	ug/kg	3900000	ND	3900000
91-20-3	Naphthalene	ug/kg	3100000	ND	3100000
98-95-3	Nitrobenzene	ug/kg	39000	92000	39000
86-30-6	N-Nitrosodiphenylamine	ug/kg	130000	ND	130000
621-64-7	N-Nitrosodi-n propylamine	ug/kg	90	ND	90
108-95-2	Phenol	ug/kg	47000000	ND	47000000
1918-02-1	Picloram	ug/kg	5500000	ND	5500000
1336-36-3	Polychlorinated biphenyls (PCBs)	ug/kg	1000	ND	1000
129-00-0	Pyrene	ug/kg	2300000	ND	2300000
122-34-9	Simazine	ug/kg	390000	ND	390000
100-42-5	Styrene	ug/kg	16000000	1500000	1500000
127-18-4	Tetrachloroethylene (Perchloroethylene)	ug/kg	12000	11000	11000
108-88-3	Toluene	ug/kg	16000000	650000	650000
8001-35-2	Toxaphene	ug/kg	600	89000	600
120-82-1	124-Trichlorobenzene	ug/kg	780000	3200000	780000
71-55-6	111-Trichloroethane	ug/kg	ND	1200000	1200000
79-00-5	112-Trichloroethane	ug/kg	310000	1800000	310000
79-01-6	Trichloroethylene	ug/kg	58000	5000	5000
108-05-4	Vinyl acetate	ug/kg	78000000	1000000	1000000
75-01-4	Vinyl chloride	ug/kg	300	30	30
108-38-3	m-Xylene	ug/kg	160000000	420000	420000
95-47-6	o-Xylene	ug/kg	160000000	410000	410000
106-42-3	p-Xylene	ug/kg	160000000	460000	460000
1330-20-7	Xylenes (total)	ug/kg	160000000	410000	410000
	Ionizable Organics				
65-85-0	Benzoic Acid	ug/kg	310000000	ND	310000000
95-57-8	2-Chlorophenol	ug/kg	390000	53000000	390000
120-83-2	24-Dichlorophenol	ug/kg	230000	ND	230000
51-28-5	24-Dinitrophenol	ug/kg	160000	ND	160000
88-85-7	Dinoseb	ug/kg	78000	ND	78000
87-86-5	Pentachlorophenol	ug/kg	3000	ND	3000
93-72-1	245-TP (Silvex)	ug/kg	630000	ND	630000
95-95-4	245-Trichlorophenol	ug/kg	7800000	ND	7800000
88-06-2	246 Trichlorophenol	ug/kg	58000	200000	58000

CAS Number	Constituent	Units	Exposure Route-Specific Values for Soils (a) Ingestion	Inhalation	Selected (Lowest) Value	
	Inorganics					
7440-36-0	Antimony	mg/kg	31	ND	31	
7440-38-2	Arsenic	mg/kg	0.4	750	0.4	
7440-39-3	Barium	mg/kg	5500	690000	5500	
7440-41-7	Beryllium	mg/kg	156 (n)	1340 (n)	156 (n)	
7440-42-8	Boron	mg/kg	7000	ND	7000	
7440-43-9	Cadmium	mg/kg	78	1800	78	
16887-00-6	Chloride	mg/kg	ND	ND	NA	
7440-47-3	Chromium total	mg/kg	390	270	270	
16065-83-1	Chromium ion trivalent	mg/kg	78000	ND	78000	
18540-29-9	Chromium (+6)	mg/kg	390	270	270	
7440-48-4	Cobalt	mg/kg	4700	ND	4700	
7440-50-8	Copper	mg/kg	2900	ND	2900	
57-12-5	Cyanide	mg/kg	1600	ND	1600	
7782-41-4	Fluoride	mg/kg	4700	ND	4700	
15438-31-0	Iron	mg/kg	ND	ND	NA	
7439-92-1	Lead	mg/kg	400	ND	400	
7439-96-5	Manganese	mg/kg	3700	69000	3700	
7439-97-6	Mercury	mg/kg	23	10	10	
7440-02-0	Nickel	mg/kg	1600	13000	1600	
14797-55-8	Nitrate as Np	mg/kg	130000	ND	130000	
7782-49-2	Selenium	mg/kg	390	ND	390	
7440-22-4	Silver	mg/kg	390	ND	390	
14808-79-8	Sulfate	mg/kg	ND	ND	NA	
7440-28-0	Thallium	mg/kg	6.3	ND	6.3	
7440-62-2	Vanadium	mg/kg	550	ND	550	
7440-66-6	Zinc	mg/kg	23000	ND	23000	
	Constituents Lacking TACO Standards					
93-76-5	2,4,5-T	ug/kg	--	--	610000	(j)
94-82-6	2,4-DB	ug/kg	--	--	490000	(j)
78-93-3	2-Butanone (MEK)	ug/kg	--	--	7300000	(j)
591-78-6	2-Hexanone	ug/kg	--	--	790000	(k)
91-57-6	2-Methylnaphthalene	ug/kg	--	--	3100000	(h)
88-74-4	2-Nitroaniline	ug/kg	--	--	3500	(j)
208-96-8	Acenaphthylene	ug/kg	--	--	4700000	(b)
5103-71-9	Alpha Chlordane	ug/kg	--	--	500	(e)
7429-90-5	Aluminum	mg/kg	--	--	76000	(j)
191-24-2	Benzo(g,h,i)perylene	ug/kg	--	--	2300000	(i)
319-85-7	beta-BHC	ug/kg	--	--	100	(c)
57-74-9	Chlordane	ug/kg	--	--	500	(e)
319-86-8	delta-BHC	ug/kg	--	--	100	(c)
132-64-9	Dibenzofuran	ug/kg	--	--	290000	(j)
1918-00-9	Dicamba	ug/kg	--	--	1800000	(j)
120-36-5	Dichloroprop	ug/kg	--	--	NA	(l)
1746-01-6	Dioxin	ug/kg	--	--	1	(m)
959-98-8	Endosulfan I	ug/kg	--	--	470000	(f)
33213-65-9	Endosulfan II	ug/kg	--	--	470000	(f)
1031-07-8	Endosulfan sulfate	ug/kg	--	--	470000	(f)
7421-93-4	Endrin aldehyde	ug/kg	--	--	23000	(g)

CAS Number	Constituent	Units	Exposure Route-Specific Values for Soils (a)			
			Ingestion	Inhalation	Selected (Lowest) Value	
53494-70-5	Endrin ketone	ug/kg	--	--	23000	(g)
5103-74-2	Gamma Chlordane	ug/kg	--	--	500	(e)
94-74-6	MCPA	ug/kg	--	--	31000	(j)
7085-19-0	MCPP	ug/kg	--	--	61000	(j)
7439-98-7	Molybdenum	ug/kg	--	--	390	(j)
85-01-8	Phenanthrene	ug/kg	--	--	23000000	(d)

Notes:
CAS - Chemical Abstracts Service.
NA - Not Available.
ND - Not Determined.
TACO - Illinois Tiered Approach to Corrective Action.
(a) - Title 35, Subtitle G, Chapter I, Part 742 Illinois Tiered Approach to Corrective Action Objectives (TACO) Tier 1 values from Appendix B, Table A.
(b) - No TACO value available. Therefore, the TACO value for acenapthene has been used due to structural similarity.
(c) - No TACO value available. Therefore, the TACO value for alpha-HCH has been used due to structural similarity.
(d) - No TACO value available. Therefore, the TACO value for anthracene has been used due to structural similarity.
(e) - No TACO value available. Therefore, the TACO value for chlordane has been used due to structural similarity.
(f) - No TACO value available. Therefore, the TACO value for endosulfan has been used due to structural similarity.
(g) - No TACO value available. Therefore, the TACO value for endrin has been used due to structural similarity.
(h) - No TACO value available. Therefore, the TACO value for naphthalene has been used due to structural similarity.
(i) - No TACO value available. Therefore, the TACO value for pyrene has been used due to structural similarity.
(j) - No TACO value, and no appropriate structural surrogate. Therefore, Region IX Preliminary Remediation Goal (PRG), October 1, 1999, used.
(k) - No TACO value, and no appropriate structural surrogate. Therefore, PRG for methyl-isobutyl-ketone
(l) - No TACO value, PRG value, appropriate surrogate, or dose response value available.
(m) - Approach for Addressing Dioxin in Soil at CERCLA and RCRA Sites. OSWER Directive 9200.4-26. April 13, 1998.
(n) - Values for beryllium re-calculated based on new dose-response information from US EPA (Integrated Risk Information System, IRIS, 10/2000) using TACO SSL methodology as presented in Appendix C Tables A and B.

Table C-2
Industrial Soil Direct-Contact Screening Values
Sauget Area 1 EE/CA and RI/FS
Human Health Risk Assessment

CAS Number	Constituent	Units	Exposure Route-Specific Values for Soils (a)					
			Industrial-Commercial			Construction Worker		
			Ingestion	Inhalation	Selected (b)	Ingestion	Inhalation	Selected (b)
83-32-9	Acenaphthene	ug/kg	1.20E+08	ND	1.20E+08	1.20E+08	ND	1.20E+08
67-64-1	Acetone	ug/kg	2.00E+08	1.00E+08	1.00E+08	2.00E+08	1.00E+08	1.00E+08
15972-60-8	Alachlor	ug/kg	7.20E+04	ND	7.20E+04	1.60E+06	ND	1.60E+06
116-06-3	Aldicarb	ug/kg	2.00E+06	ND	2.00E+06	2.00E+05	ND	2.00E+05
309-00-2	Aldrin	ug/kg	3.00E+02	6.60E+03	3.00E+02	6.10E+03	9.30E+03	6.10E+03
120-12-7	Anthracene	ug/kg	6.10E+08	ND	6.10E+08	6.10E+08	ND	6.10E+08
1912-24-9	Atrazine	ug/kg	7.20E+07	ND	7.20E+07	7.10E+06	ND	7.10E+06
71-43-2	Benzene	ug/kg	2.00E+05	1.50E+03	1.50E+03	4.30E+06	2.10E+03	2.10E+03
56-55-3	Benzo(a)anthracene	ug/kg	8.00E+03	ND	8.00E+03	1.70E+05	ND	1.70E+05
205-99-2	Benzo(b)fluoranthene	ug/kg	8.00E+03	ND	8.00E+03	1.70E+05	ND	1.70E+05
207-08-9	Benzo(k)fluroanthene	ug/kg	7.80E+04	ND	7.80E+04	1.70E+06	ND	1.70E+06
50-32-8	Benzo(a)pyrene	ug/kg	8.00E+02	ND	8.00E+02	1.70E+04	ND	1.70E+04
111-44-4	Bis(2-chloroethyl)ether	ug/kg	5.00E+03	4.70E+02	4.70E+02	7.50E+04	6.60E+02	6.60E+02
117-81-7	Bis(2-ethylhexyl)phthalate	ug/kg	4.10E+05	3.10E+07	4.10E+05	4.10E+06	3.10E+07	4.10E+06
75-27-4	Bromodichloromethane	ug/kg	9.20E+04	3.00E+06	9.20E+04	2.00E+06	3.00E+06	2.00E+06
75-25-2	Bromoform	ug/kg	7.20E+05	1.00E+05	1.00E+05	1.60E+07	1.40E+05	1.40E+05
71-36-3	Butanol	ug/kg	2.00E+08	1.00E+07	1.00E+07	2.00E+08	1.00E+07	1.00E+07
85-68-7	Butyl benzyl phthalate	ug/kg	4.10E+08	9.30E+05	9.30E+05	4.10E+08	9.30E+05	9.30E+05
86-74-8	Carbazole	ug/kg	2.90E+05	ND	2.90E+05	6.20E+06	ND	6.20E+06
1563-66-2	Carbofuran	ug/kg	1.00E+07	ND	1.00E+07	1.00E+06	ND	1.00E+06
75-15-0	Carbon disulfide	ug/kg	2.00E+08	7.20E+05	7.20E+05	2.00E+07	9.00E+03	9.00E+03
56-23-5	Carbon tetrachloride	ug/kg	4.40E+04	6.40E+02	6.40E+02	4.10E+05	9.00E+02	9.00E+02
57-74-9	Chlordane	ug/kg	4.00E+03	3.80E+04	4.00E+03	1.20E+04	5.30E+04	1.20E+04
106-47-8	4-Chloroaniline (p-Chloroaniline)	ug/kg	8.20E+06	ND	8.20E+06	8.20E+05	ND	8.20E+05
108-90-7	Chlorobenzene (Monochlorobenzene)	ug/kg	4.10E+07	2.10E+05	2.10E+05	4.10E+06	1.30E+03	1.30E+03
124-48-1	Chlorodibromomethane	ug/kg	4.10E+07	1.30E+06	1.30E+06	4.10E+07	1.30E+06	1.30E+06
67-66-3	Chloroform	ug/kg	9.40E+05	5.40E+02	5.40E+02	2.00E+06	7.60E+02	7.60E+02
218-01-9	Chrysene	ug/kg	7.80E+05	ND	7.80E+05	1.70E+07	ND	1.70E+07
94-75-7	24-D	ug/kg	2.00E+07	ND	2.00E+07	2.00E+06	ND	2.00E+06
75-99-0	Dalapon	ug/kg	6.10E+07	ND	6.10E+07	6.10E+06	ND	6.10E+06
72-54-8	DDD	ug/kg	2.40E+04	ND	2.40E+04	5.20E+05	ND	5.20E+05
72-55-9	DDE	ug/kg	1.70E+04	ND	1.70E+04	3.70E+05	ND	3.70E+05
50-29-3	DDT	ug/kg	1.70E+04	1.50E+06	1.70E+04	1.00E+05	2.10E+06	1.00E+05
53-70-3	Dibenzo(ah)anthracene	ug/kg	8.00E+02	ND	8.00E+02	1.70E+04	ND	1.70E+04
96-12-8	12-Dibromo-3 chloropropane	ug/kg	4.00E+03	1.70E+04	4.00E+03	8.90E+04	1.10E+02	1.10E+02
106-93-4	12-Dibromoethane (Ethylene dibromide)	ug/kg	7.00E+01	3.20E+02	7.00E+01	1.50E+03	4.50E+02	4.50E+02
84-74-2	Di-n-butyl phthalate	ug/kg	2.00E+08	2.30E+06	2.30E+06	2.00E+08	2.30E+06	2.30E+06
95-50-1	12-Dichlorobenzene (o - Dichlorobenzene)	ug/kg	1.80E+08	5.60E+05	5.60E+05	1.80E+07	3.10E+05	3.10E+05
106-46-7	14-Dichlorobenzene (p - Dichlorobenzene)	ug/kg	ND	1.70E+07	1.70E+07	ND	3.40E+05	3.40E+05
91-94-1	33'-Dichlorobenzidine	ug/kg	1.30E+04	ND	1.30E+04	2.80E+05	ND	2.80E+05

Table C-2
Industrial Soil Direct-Contact Screening Values
Saugel Area 1 EE/CA and RI/FS
Human Health Risk Assessment

			Exposure Route-Specific Values for Soils (a)					
			Industrial-Commercial			Construction Worker		
CAS Number	Constituent	Units	Ingestion	Inhalation	Selected (b)	Ingestion	Inhalation	Selected (b)
75-34-3	11-Dichloroethane	ug/kg	2.00E+08	1.70E+06	1.70E+06	2.00E+08	1.30E+05	1.30E+05
107-06-2	12-Dichloroethane (Ethylene dichloride)	ug/kg	6.30E+04	7.00E+02	7.00E+02	1.40E+06	9.90E+02	9.90E+02
75-35-4	11-Dichloroethylene	ug/kg	1.80E+07	1.50E+06	1.50E+06	1.80E+06	1.50E+06	1.50E+06
156-59-2	cis-12-Dichloroethylene	ug/kg	2.00E+07	1.20E+06	1.20E+06	2.00E+07	1.20E+06	1.20E+06
156-60-5	trans-12 Dichloroethylene	ug/kg	4.10E+07	3.10E+06	3.10E+06	4.10E+07	3.10E+06	3.10E+06
78-87-5	12-Dichloropropane	ug/kg	8.40E+04	2.30E+04	2.30E+04	1.80E+06	5.00E+02	5.00E+02
542-75-6	13-Dichloropropene	ug/kg	3.30E+04	2.30E+02	2.30E+02	6.10E+05	3.30E+02	3.30E+02
60-57-1	Dieldrin	ug/kg	4.00E+02	2.20E+03	4.00E+02	7.80E+03	3.10E+03	3.10E+03
84-66-2	Diethyl phthalate	ug/kg	1.00E+09	2.00E+06	2.00E+06	1.00E+09	2.00E+06	2.00E+06
105-67-9	24-Dimethylphenol	ug/kg	4.10E+07	ND	4.10E+07	4.10E+07	ND	4.10E+07
121-14-2	24-Dinitrotoluene	ug/kg	8.40E+03	ND	8.40E+03	1.80E+05	ND	1.80E+05
606-20-2	26-Dinitrotoluene	ug/kg	8.40E+03	ND	8.40E+03	1.80E+05	ND	1.80E+05
117-84-0	Di-n-octyl phthalate	ug/kg	4.10E+07	1.00E+07	1.00E+07	4.10E+06	1.00E+07	4.10E+06
115-29-7	Endosulfan	ug/kg	1.20E+07	ND	1.20E+07	1.20E+06	ND	1.20E+06
145-73-3	Endothall	ug/kg	4.10E+07	ND	4.10E+07	4.10E+06	ND	4.10E+06
72-20-8	Endrin	ug/kg	6.10E+05	ND	6.10E+05	6.10E+04	ND	6.10E+04
100-41-4	Ethylbenzene	ug/kg	2.00E+08	4.00E+05	4.00E+05	2.00E+07	5.80E+04	5.80E+04
206-44-0	Fluoranthene	ug/kg	8.20E+07	ND	8.20E+07	8.20E+07	ND	8.20E+07
86-73-7	Fluorene	ug/kg	8.20E+07	ND	8.20E+07	8.20E+07	ND	8.20E+07
76-44-8	Heptachlor	ug/kg	1.00E+03	1.10E+04	1.00E+03	2.80E+04	1.60E+04	1.60E+04
1024-57-3	Heptachlor epoxide	ug/kg	6.00E+02	9.20E+03	6.00E+02	2.70E+03	1.30E+04	2.70E+03
118-74-1	Hexachlorobenzene	ug/kg	4.00E+03	1.80E+03	1.80E+03	7.80E+04	2.60E+03	2.60E+03
319-84-6	alpha-HCH (alpha-BHC)	ug/kg	9.00E+02	1.50E+03	9.00E+02	2.00E+04	2.10E+03	2.10E+03
58-89-9	gamma-HCH (Lindane)	ug/kg	4.00E+03	ND	4.00E+03	9.60E+04	ND	9.60E+04
77-47-4	Hexachlorocyclopentadiene	ug/kg	1.40E+07	1.60E+04	1.60E+04	1.40E+07	1.10E+03	1.10E+03
67-72-1	Hexachloroethane	ug/kg	2.00E+06	ND	2.00E+06	2.00E+06	ND	2.00E+06
193-39-5	Indeno(123-cd)pyrene	ug/kg	8.00E+03	ND	8.00E+03	1.70E+05	ND	1.70E+05
78-59-1	Isophorone	ug/kg	4.10E+08	4.60E+06	4.60E+06	4.10E+08	4.60E+06	4.60E+06
72-43-5	Methoxychlor	ug/kg	1.00E+07	ND	1.00E+07	1.00E+06	ND	1.00E+06
74-83-9	Methyl bromide (Bromomethane)	ug/kg	2.90E+06	1.50E+04	1.50E+04	1.00E+06	3.90E+03	3.90E+03
75-09-2	Methylene chloride (Dichloromethane)	ug/kg	7.60E+05	2.40E+04	2.40E+04	1.20E+07	3.40E+04	3.40E+04
95-48-7	2-Methylphenol (o - Cresol)	ug/kg	1.00E+08	ND	1.00E+08	1.00E+08	ND	1.00E+08
91-20-3	Naphthalene	ug/kg	1.20E+06	ND	1.20E+06	8.20E+06	ND	8.20E+06
98-95-3	Nitrobenzene	ug/kg	8.00E+02	ND	8.00E+02	1.00E+06	9.40E+03	9.40E+03
86-30-6	N-Nitrosodiphenylamine	ug/kg	8.20E+07	ND	8.20E+07	2.50E+07	ND	2.50E+07
621-64-7	N-Nitrosodi-n propylamine	ug/kg	1.00E+06	1.40E+05	1.40E+05	1.80E+04	ND	1.80E+04
108-95-2	Phenol	ug/kg	1.00E+09	ND	1.00E+09	1.20E+08	ND	1.20E+08
1918-02-1	Picloram	ug/kg	1.40E+08	ND	1.40E+08	1.40E+07	ND	1.40E+07
1336-36-3	Polychlorinated biphenyls (PCBs)	ug/kg	1.00E+03	ND	1.00E+03	ND	ND	1.00E+03
129-00-0	Pyrene	ug/kg	6.10E+07	ND	6.10E+07	6.10E+07	ND	6.10E+07

Table C-2
Industrial Soil Direct-Contact Screening Values
Sauget Area 1 EE/CA and RI/FS
Human Health Risk Assessment

CAS Number	Constituent	Units	Exposure Route-Specific Values for Soils (a)					
			Industrial-Commercial			Construction Worker		
			Ingestion	Inhalation	Selected (b)	Ingestion	Inhalation	Selected (b)
122-34-9	Simazine	ug/kg	1.00E+07	ND	1.00E+07	1.00E+06	ND	1.00E+06
100-42-5	Styrene	ug/kg	4.10E+08	1.50E+06	1.50E+06	4.10E+07	4.30E+05	4.30E+05
127-18-4	Tetrachloroethylene (Perchloroethylene)	ug/kg	1.10E+05	2.00E+04	2.00E+04	2.40E+06	2.80E+04	2.80E+04
108-88-3	Toluene	ug/kg	4.10E+08	6.50E+05	6.50E+05	4.10E+08	4.20E+04	4.20E+04
8001-35-2	Toxaphene	ug/kg	5.20E+03	1.70E+05	5.20E+03	1.10E+05	2.40E+05	1.10E+05
120-82-1	124-Trichlorobenzene	ug/kg	2.00E+07	3.20E+06	3.20E+06	2.00E+06	9.20E+05	9.20E+05
71-55-6	111-Trichloroethane	ug/kg	ND	1.20E+06	1.20E+06	ND	1.20E+06	1.20E+06
79-00-5	112-Trichloroethane	ug/kg	8.20E+06	1.80E+06	1.80E+06	8.20E+06	1.80E+06	1.80E+06
79-01-6	Trichloroethylene	ug/kg	5.20E+05	8.90E+03	8.90E+03	1.20E+06	1.20E+04	1.20E+04
108-05-4	Vinyl acetate	ug/kg	1.00E+09	1.60E+06	1.60E+06	2.00E+08	1.00E+04	1.00E+04
75-01-4	Vinyl chloride	ug/kg	3.00E+03	6.00E+01	6.00E+01	6.50E+04	8.00E+01	8.00E+01
108-38-3	m-Xylene	ug/kg	1.00E+09	4.20E+05	4.20E+05	4.10E+08	4.20E+05	4.20E+05
95-47-6	o-Xylene	ug/kg	1.00E+09	4.10E+05	4.10E+05	4.10E+08	4.10E+05	4.10E+05
106-42-3	p-Xylene	ug/kg	1.00E+09	4.60E+05	4.60E+05	4.10E+08	4.60E+05	4.60E+05
1330-20-7	Xylenes (total)	ug/kg	1.00E+09	4.10E+05	4.10E+05	4.10E+08	4.10E+05	4.10E+05
	Ionizable Organics							
65-85-0	Benzoic Acid	ug/kg	1.00E+09	ND	1.00E+09	8.20E+08	ND	8.20E+08
95-57-8	2-Chlorophenol	ug/kg	1.00E+07	5.30E+07	1.00E+07	1.00E+07	5.30E+07	1.00E+07
120-83-2	24-Dichlorophenol	ug/kg	6.10E+06	ND	6.10E+06	6.10E+05	ND	6.10E+05
51-28-5	24-Dinitrophenol	ug/kg	4.10E+06	ND	4.10E+06	4.10E+05	ND	4.10E+05
88-85-7	Dinoseb	ug/kg	2.00E+06	ND	2.00E+06	2.00E+05	ND	2.00E+05
87-86-5	Pentachlorophenol	ug/kg	2.40E+04	ND	2.40E+04	5.20E+05	ND	5.20E+05
93-72-1	245-TP (Silvex)	ug/kg	1.60E+07	ND	1.60E+07	1.60E+06	ND	1.60E+06
95-95-4	245-Trichlorophenol	ug/kg	2.00E+08	ND	2.00E+08	2.00E+08	ND	2.00E+08
88-06-2	246 Trichlorophenol	ug/kg	5.20E+05	3.90E+05	3.90E+05	1.10E+07	5.40E+05	5.40E+05
	Inorganics							
7440-36-0	Antimony	mg/kg	8.20E+02	ND	8.20E+02	8.20E+01	ND	8.20E+01
7440-38-2	Arsenic	mg/kg	3.00E+00	1.20E+03	3.00E+00	6.10E+01	2.50E+04	6.10E+01
7440-39-3	Barium	mg/kg	1.40E+05	9.10E+05	1.40E+05	1.40E+04	8.70E+05	1.40E+04
7440-41-7	Beryllium	mg/kg	4.09E+03 (o)	2.11E+03 (o)	2.11E+03 (o)	4.08E+02 (o)	3.47E+03 (o)	4.08E+02 (o)
7440-42-8	Boron	mg/kg	1.80E+05	1.00E+06	1.80E+05	1.80E+04	1.00E+06	1.80E+04
7440-43-9	Cadmium	mg/kg	2.00E+03	2.80E+03	2.00E+03	2.00E+02	5.90E+04	2.00E+02
16887-00-6	Chloride	mg/kg	ND	ND	NA	ND	ND	NA
7440-47-3	Chromium total	mg/kg	1.00E+04	4.20E+02	4.20E+02	4.10E+03	8.80E+03	4.10E+03
16065-83-1	Chromium ion trivalent	mg/kg	1.00E+06	ND	1.00E+06	3.30E+05	ND	3.30E+05
18540-29-9	Chromium (+6)	mg/kg	1.00E+04	4.20E+02	4.20E+02	4.10E+03	8.80E+03	4.10E+03
7440-48-4	Cobalt	mg/kg	1.20E+05	ND	1.20E+05	1.20E+04	ND	1.20E+04
7440-50-8	Copper	mg/kg	8.20E+04	ND	8.20E+04	8.20E+03	ND	8.20E+03
57-12-5	Cyanide	mg/kg	4.10E+04	ND	4.10E+04	4.10E+03	ND	4.10E+03
7782-41-4	Fluoride	mg/kg	1.20E+05	ND	1.20E+05	1.20E+04	ND	1.20E+04

C-10

Table C-2
Industrial Soil Direct-Contact Screening Values
Sauget Area 1 EE/CA and RI/FS
Human Health Risk Assessment

CAS Number	Constituent	Units	Exposure Route-Specific Values for Soils (a)							
			Industrial-Commercial				Construction Worker			
			Ingestion	Inhalation	Selected (b)		Ingestion	Inhalation	Selected (b)	
15438-31-0	Iron	mg/kg	ND	ND	NA		ND	ND	NA	
7439-92-1	Lead (p)	mg/kg	7.50E+02	ND	7.50E+02		7.50E+02	ND	7.50E+02	
7439-96-5	Manganese	mg/kg	9.60E+04	9.10E+04	9.10E+04		9.60E+03	8.70E+03	8.70E+03	
7439-97-6	Mercury	mg/kg	6.10E+02	5.40E+05	6.10E+02		6.10E+01	5.20E+04	6.10E+01	
7440-02-0	Nickel	mg/kg	4.10E+04	2.10E+04	2.10E+04		4.10E+03	4.40E+05	4.10E+03	
14797-55-8	Nitrate as Np	mg/kg	1.00E+06	ND	1.00E+06		3.30E+05	ND	3.30E+05	
7782-49-2	Selenium	mg/kg	1.00E+04	ND	1.00E+04		1.00E+03	ND	1.00E+03	
7440-22-4	Silver	mg/kg	1.00E+04	ND	1.00E+04		1.00E+03	ND	1.00E+03	
14808-79-8	Sulfate	mg/kg	ND	ND	NA		ND	ND	NA	
7440-28-0	Thallium	mg/kg	1.60E+02	ND	1.60E+02		1.60E+02	ND	1.60E+02	
7440-62-2	Vanadium	mg/kg	1.40E+04	ND	1.40E+04		1.40E+03	ND	1.40E+03	
7440-66-6	Zinc	mg/kg	6.10E+05	ND	6.10E+05		6.10E+04	ND	6.10E+04	
	Constituents Lacking TACO Standards									
93-76-5	2,4,5-T	ug/kg	--	--	8.80E+06	(k)	ug/kg		8.80E+06	(k)
94-82-6	2,4-DB	ug/kg	--	--	7.00E+06	(k)	ug/kg		7.00E+06	(k)
78-93-3	2-Butanone (MEK)	ug/kg	--	--	2.80E+07	(k)	ug/kg		2.80E+07	(k)
591-78-6	2-Hexanone	ug/kg	--	--	2.90E+06	(l)	ug/kg		2.90E+06	(l)
91-57-6	2-Methylnaphthalene	ug/kg	--	--	8.20E+07	(i)	ug/kg		8.20E+06	(i)
88-74-4	2-Nitroaniline	ug/kg	--	--	5.00E+04	(k)	ug/kg		5.00E+04	(k)
208-96-8	Acenaphthylene	ug/kg	--	--	1.20E+08	(c)	ug/kg		1.20E+08	(c)
5103-71-9	Alpha Chlordane	ug/kg	--	--	4.00E+03	(f)	ug/kg		1.20E+04	(f)
7429-90-5	Aluminum	ug/kg	--	--	1.00E+05	(k)	mg/kg		1.00E+05	(k)
191-24-2	Benzo(g,h,i)perylene	ug/kg	--	--	6.10E+07	(j)	ug/kg		6.10E+07	(j)
319-85-7	beta-BHC	ug/kg	--	--	9.00E+02	(d)	ug/kg		2.10E+03	(d)
57-74-9	Chlordane	ug/kg	--	--	4.00E+03	(f)	ug/kg		1.20E+04	(f)
319-86-8	delta-BHC	ug/kg	--	--	9.00E+02	(d)	ug/kg		2.10E+03	(d)
132-64-9	Dibenzofuran	ug/kg	--	--	5.10E+06	(k)	ug/kg		5.10E+06	(k)
1918-00-9	Dicamba	ug/kg	--	--	2.60E+07	(k)	ug/kg		2.60E+07	(k)
120-36-5	Dichloroprop	ug/kg	--	--	NA	(n)			NA	(n)
1746-01-6	Dioxin	ug/kg	--	--	1.00E+00	(m)	ug/kg		1.00E+00	(m)
959-98-8	Endosulfan I	ug/kg	--	--	1.20E+07	(g)	ug/kg		1.20E+06	(g)
33213-65-9	Endosulfan II	ug/kg	--	--	1.20E+07	(g)	ug/kg		1.20E+06	(g)
1031-07-8	Endosulfan sulfate	ug/kg	--	--	1.20E+07	(g)	ug/kg		1.20E+06	(g)
7421-93-4	Endrin aldehyde	ug/kg	--	--	6.10E+05	(h)	ug/kg		6.10E+04	(h)
53494-70-5	Endrin ketone	ug/kg	--	--	6.10E+05	(h)	ug/kg		6.10E+04	(h)
5103-74-2	Gamma Chlordane	ug/kg	--	--	4.00E+03	(f)	ug/kg		1.20E+04	(f)

Table C-2
Industrial Soil Direct-Contact Screening Values
Sauget Area 1 EE/CA and RI/FS
Human Health Risk Assessment

CAS Number	Constituent	Units	Exposure Route-Specific Values for Soils (a)							
			Industrial-Commercial				Construction Worker			
			Ingestion	Inhalation	Selected (b)		Ingestion	Inhalation	Selected (b)	
94-74-6	MCPA	ug/kg	--	--	4.40E+05	(k)	ug/kg		4.40E+05	(k)
7085-19-0	MCPP	ug/kg	--	--	8.80E+05	(k)	ug/kg		8.80E+05	(k)
7439-98-7	Molybdenum	ug/kg	--	--	1.00E+04	(k)	mg/kg		1.00E+04	(k)
85-01-8	Phenanthrene	ug/kg	--	--	6.10E+08	(e)	ug/kg		6.10E+08	(e)

Notes:
CAS - Chemical Abstracts Service.
NA - Not Available.
ND - Not Determined.
TACO - Illinois Tiered Approach to Corrective Action.
(a) - Title 35, Subtitle G, Chapter I, Part 742 Illinois Tiered Approach to Corrective Action Objectives (TACO) Tier 1 values from Appendix B, Table A.
(b) - Selected value is the lower of the ingestion and inhalation Tier 1 standards.
(c) - No TACO value available. Therefore, the TACO value for acenapthene has been used due to structural similarity.
(d) - No TACO value available. Therefore, the TACO value for alpha-HCH has been used due to structural similarity.
(e) - No TACO value available. Therefore, the TACO value for anthracene has been used due to structural similarity.
(f) - No TACO value available. Therefore, the TACO value for chlordane has been used due to structural similarity.
(g) - No TACO value available. Therefore, the TACO value for endosulfan has been used due to structural similarity.
(h) - No TACO value available. Therefore, the TACO value for endrin has been used due to structural similarity.
(i) - No TACO value available. Therefore, the TACO value for naphthalene has been used due to structural similarity.
(j) - No TACO value available. Therefore, the TACO value for pyrene has been used due to structural similarity.
(k) - No TACO value, and no appropriate structural surrogate. Therefore, Region IX Preliminary Remediation Goal (PRG), October 1, 1999, used.
(l) - No TACO value, and no appropriate structural surrogate. Therefore, PRG for methyl-isobutyl-ketone
(m) - Approach for Addressing Dioxin in Soil at CERCLA and RCRA Sites. OSWER Directive 9200.4-26. April 13, 1998.
(n) - No TACO value, PRG value, appropriate surrogate, or dose response value available.
(o) - Values for beryllium re-calculated based on new dose-response information from US EPA (Integrated Risk Information System, IRIS, 10/2000) using TACO SSL methodology as presented in Appendix C Tables A and B.
(p) - Value for lead provided in the USEPA Region 9 PRG Table, November 1, 2000, used as this value is specific to industrial exposure scenarios.

CAS Number	Constituent	Units	Class II (a)
83-32-9	Acenaphthene	ug/kg	2900000
67-64-1	Acetone	ug/kg	16000
15972-60-8	Alachlor	ug/kg	200
116-06-3	Aldicarb	ug/kg	70
309-00-2	Aldrin	ug/kg	2500
120-12-7	Anthracene	ug/kg	59000000
1912-24-9	Atrazine	ug/kg	330
71-43-2	Benzene	ug/kg	170
56-55-3	Benzo(a)anthracene	ug/kg	8000
205-99-2	Benzo(b)fluoranthene	ug/kg	25000
207-08-9	Benzo(k)fluroanthene	ug/kg	250000
50-32-8	Benzo(a)pyrene	ug/kg	82000
111-44-4	Bis(2-chloroethyl)ether	ug/kg	0.4
117-81-7	Bis(2-ethylhexyl)phthalate	ug/kg	31000000
75-27-4	Bromodichloromethane	ug/kg	600
75-25-2	Bromoform	ug/kg	800
71-36-3	Butanol	ug/kg	17000
85-68-7	Butyl benzyl phthalate	ug/kg	930000
86-74-8	Carbazole	ug/kg	2800
1563-66-2	Carbofuran	ug/kg	1100
75-15-0	Carbon disulfide	ug/kg	160000
56-23-5	Carbon tetrachloride	ug/kg	330
57-74-9	Chlordane	ug/kg	48000
106-47-8	4-Chloroaniline (p-Chloroaniline)	ug/kg	700
108-90-7	Chlorobenzene (Monochlorobenzene)	ug/kg	6500
124-48-1	Chlorodibromomethane	ug/kg	400
67-66-3	Chloroform	ug/kg	2900
218-01-9	Chrysene	ug/kg	800000
94-75-7	24-D	ug/kg	7700
75-99-0	Dalapon	ug/kg	8500
72-54-8	DDD	ug/kg	80000
72-55-9	DDE	ug/kg	270000
50-29-3	DDT	ug/kg	160000
53-70-3	Dibenzo(ah)anthracene	ug/kg	7600
96-12-8	12-Dibromo-3 chloropropane	ug/kg	2
106-93-4	12-Dibromoethane (Ethylene dibromide)	ug/kg	4
84-74-2	Di-n-butyl phthalate	ug/kg	2300000
95-50-1	12-Dichlorobenzene (o - Dichlorobenzene)	ug/kg	43000
106-46-7	14-Dichlorobenzene (p - Dichlorobenzene)	ug/kg	11000
91-94-1	33'-Dichlorobenzidine	ug/kg	33
75-34-3	11-Dichloroethane	ug/kg	110000
107-06-2	12-Dichloroethane (Ethylene dichloride)	ug/kg	100
75-35-4	11-Dichloroethylene	ug/kg	300
156-59-2	cis-12-Dichloroethylene	ug/kg	1100
156-60-5	trans-12 Dichloroethylene	ug/kg	3400
78-87-5	12-Dichloropropane	ug/kg	150
542-75-6	13-Dichloropropene	ug/kg	20
60-57-1	Dieldrin	ug/kg	20
84-66-2	Diethyl phthalate	ug/kg	470000
105-67-9	24-Dimethylphenol	ug/kg	9000
121-14-2	24-Dinitrotoluene	ug/kg	0.8
606-20-2	26-Dinitrotoluene	ug/kg	0.7
117-84-0	Di-n-octyl phthalate	ug/kg	10000000
115-29-7	Endosulfan	ug/kg	90000
145-73-3	Endothall	ug/kg	400

CAS Number	Constituent	Units	Class II (a)	
72-20-8	Endrin	ug/kg	5000	
100-41-4	Ethylbenzene	ug/kg	19000	
206-44-0	Fluoranthene	ug/kg	21000000	
86-73-7	Fluorene	ug/kg	2800000	
76-44-8	Heptachlor	ug/kg	110000	
1024-57-3	Heptachlor epoxide	ug/kg	3300	
118-74-1	Hexachlorobenzene	ug/kg	11000	
319-84-6	alpha-HCH (alpha-BHC)	ug/kg	3	
58-89-9	gamma-HCH (Lindane)	ug/kg	47	
77-47-4	Hexachlorocyclopentadiene	ug/kg	2200000	
67-72-1	Hexachloroethane	ug/kg	2600	
193-39-5	Indeno(123-cd)pyrene	ug/kg	69000	
78-59-1	Isophorone	ug/kg	8000	
72-43-5	Methoxychlor	ug/kg	780000	
74-83-9	Methyl bromide (Bromomethane)	ug/kg	1200	
75-09-2	Methylene chloride (Dichloromethane)	ug/kg	200	
95-48-7	2-Methylphenol (o - Cresol)	ug/kg	15000	
91-20-3	Naphthalene	ug/kg	420000	
98-95-3	Nitrobenzene	ug/kg	100	
86-30-6	N-Nitrosodiphenylamine	ug/kg	5600	
621-64-7	N-Nitrosodi-n propylamine	ug/kg	0.05	
108-95-2	Phenol	ug/kg	100000	
1918-02-1	Picloram	ug/kg	20000	
1336-36-3	Polychlorinated biphenyls (PCBs)	ug/kg	NA	
129-00-0	Pyrene	ug/kg	21000000	
122-34-9	Simazine	ug/kg	370	
100-42-5	Styrene	ug/kg	18000	
127-18-4	Tetrachloroethylene (Perchloroethylene)	ug/kg	300	
108-88-3	Toluene	ug/kg	29000	
8001-35-2	Toxaphene	ug/kg	150000	
120-82-1	124-Trichlorobenzene	ug/kg	53000	
71-55-6	111-Trichloroethane	ug/kg	9600	
79-00-5	112-Trichloroethane	ug/kg	300	
79-01-6	Trichloroethylene	ug/kg	300	
108-05-4	Vinyl acetate	ug/kg	170000	
75-01-4	Vinyl chloride	ug/kg	70	
108-38-3	m-Xylene	ug/kg	210000	
95-47-6	o-Xylene	ug/kg	190000	
106-42-3	p-Xylene	ug/kg	200000	
1330-20-7	Xylenes (total)	ug/kg	150000	
	Ionizable Organics			
65-85-0	Benzoic Acid	ug/kg	400000	(j)
95-57-8	2-Chlorophenol	ug/kg	3100	(j)
120-83-2	24-Dichlorophenol	ug/kg	690	(j)
51-28-5	24-Dinitrophenol	ug/kg	200	
88-85-7	Dinoseb	ug/kg	2500	(j)
87-86-5	Pentachlorophenol	ug/kg	100	(j)
93-72-1	245-TP (Silvex)	ug/kg	55000	(j)
95-95-4	245-Trichlorophenol	ug/kg	64000	(j)
88-06-2	246 Trichlorophenol	ug/kg	70	(j)

CAS Number	Constituent	Units	Class II (a)	
	Inorganics			
7440-36-0	Antimony	mg/kg	20	(j)
7440-38-2	Arsenic	mg/kg	100	(j)
7440-39-3	Barium	mg/kg	260	(j)
7440-41-7	Beryllium	mg/kg	140	(j)
7440-42-8	Boron	mg/kg	NA	(k)
7440-43-9	Cadmium	mg/kg	10	(j)
16887-00-6	Chloride	mg/kg	NA	(k)
7440-47-3	Chromium total	mg/kg	NA	(k)
16065-83-1	Chromium ion trivalent	mg/kg	NA	(k)
18540-29-9	Chromium (+6)	mg/kg	ND	(j)
7440-48-4	Cobalt	mg/kg	NA	(k)
7440-50-8	Copper	mg/kg	330	(j)
57-12-5	Cyanide	mg/kg	120	(j)
7782-41-4	Fluoride	mg/kg	NA	(k)
15438-31-0	Iron	mg/kg	NA	(k)
7439-92-1	Lead	mg/kg	NA	(k)
7439-96-5	Manganese	mg/kg	NA	(k)
7439-97-6	Mercury	mg/kg	0.05	(j)
7440-02-0	Nickel	mg/kg	400	(j)
14797-55-8	Nitrate as Np	mg/kg	NA	(k)
7782-49-2	Selenium	mg/kg	2.4	(j)
7440-22-4	Silver	mg/kg	NA	(k)
14808-79-8	Sulfate	mg/kg	NA	(k)
7440-28-0	Thallium	mg/kg	16	(j)
7440-62-2	Vanadium	mg/kg	NA	(k)
7440-66-6	Zinc	mg/kg	2000	(j)
	Constituents Lacking Standards			
91-57-6	2-Methylnaphthalene	ug/kg	420000	(h)
208-96-8	Acenaphthylene	ug/kg	2900000	(b)
5103-71-9	Alpha Chlordane	ug/kg	48000	(e)
191-24-2	Benzo(g,h,i)perylene	ug/kg	21000000	(i)
319-85-7	beta-BHC	ug/kg	3	(c)
57-74-9	Chlordane	ug/kg	48000	(e)
319-86-8	delta-BHC	ug/kg	3	(c)
959-98-8	Endosulfan I	ug/kg	90000	(f)
33213-65-9	Endosulfan II	ug/kg	90000	(f)
1031-07-8	Endosulfan sulfate	ug/kg	90000	(f)
7421-93-4	Endrin aldehyde	ug/kg	5000	(g)
53494-70-5	Endrin ketone	ug/kg	5000	(g)
5103-74-2	Gamma Chlordane	ug/kg	48000	(e)
85-01-8	Phenanthrene	ug/kg	59000000	(d)

Notes:
CAS - Chemical Abstracts Service.
NA - Not Available.
ND - Not Determined.
TACO - Illinois Tiered Approach to Corrective Action.
(a) - Title 35, Subtitle G, Chapter I, Part 742 Illinois Tiered Approach to Corrective Action Objectives (TACO) Tier 1 values from Appendix B, Table A.
(b) - No TACO value available. Therefore, the TACO value for acenapthene has been used due to structural similarity.
(c) - No TACO value available. Therefore, the TACO value for alpha-HCH has been used due to structural similarity.
(d) - No TACO value available. Therefore, the TACO value for anthracene has been used due to structural similarity.
(e) - No TACO value available. Therefore, the TACO value for chlordane has been used due to structural similarity.
(f) - No TACO value available. Therefore, the TACO value for endosulfan has been used due to structural similarity.
(g) - No TACO value available. Therefore, the TACO value for endrin has been used due to structural similarity.
(h) - No TACO value available. Therefore, the TACO value for naphthalene has been used due to structural similarity.
(i) - No TACO value available. Therefore, the TACO value for pyrene has been used due to structural similarity.
(j) - Lowest pH specific value from TACO Appendix B, Table D.
(k) - No pH specific value listed in TACO Appendix B, Table D.

CAS Number	Constituent	Class II (ug/L) (a)
71-55-6	1,1,1-Trichloroethane	1000
79-00-5	1,1,2-Trichloroethane	50
75-34-3	1,1-Dichloroethane	3500
75-35-4	1,1-Dichloroethylene	35
120-82-1	1,2,4-Trichlorobenzene	700
96-12-8	1,2-Dibromo-3-chloropropane	0.2
106-93-4	1,2-Dibromoethane (Ethylene dibromide)	0.5
95-50-1	1,2-Dichlorobenzene (o – Dichlorobenzene)	1500
107-06-2	1,2-Dichloroethane (Ethylene dichloride)	25
78-87-5	1,2-Dichloropropane	25
542-75-6	1,3-Dichloropropene	5
106-46-7	1,4-Dichlorobenzene (p - Dichlorobenzene)	375
93-72-1	2,4,5-TP (Silvex)	250
95-95-4	2,4,5-Trichlorophenol	3500
88-06-2	2,4,6 Trichlorophenol	32
94-75-7	2,4-D	350
120-83-2	2,4-Dichlorophenol	21
105-67-9	2,4-Dimethylphenol	140
51-28-5	2,4-Dinitrophenol	14
121-14-2	2,4-Dinitrotoluene	0.02
606-20-2	2,6-Dinitrotoluene	0.1
95-57-8	2-Chlorophenol	175
95-48-7	2-Methylphenol (o - Cresol)	350
91-94-1	3,3'-Dichlorobenzidine	100
106-47-8	4-Chloroaniline (p-Chloroaniline)	28
83-32-9	Acenaphthene	2100
67-64-1	Acetone	700
15972-60-8	Alachlor	10
116-06-3	Aldicarb	15
309-00-2	Aldrin	0.2
319-84-6	alpha-HCH (alpha-BHC)	0.15
120-12-7	Anthracene	10500
1912-24-9	Atrazine	15
71-43-2	Benzene	25
56-55-3	Benzo(a)anthracene	0.65
50-32-8	Benzo(a)pyrene	2
205-99-2	Benzo(b)fluoranthene	0.9
207-08-9	Benzo(k)fluroanthene	0.85
65-85-0	Benzoic Acid	28000
111-44-4	Bis(2-chloroethyl)ether	10
117-81-7	Bis(2-ethylhexyl)phthalate	60
75-27-4	Bromodichloromethane	0.02
75-25-2	Bromoform	0.2
71-36-3	Butanol	700
85-68-7	Butyl benzyl phthalate	7000
1563-66-2	Carbofuran	200
75-15-0	Carbon disulfide	3500
56-23-5	Carbon tetrachloride	25
57-74-9	Chlordane	10
108-90-7	Chlorobenzene (Monochlorobenzene)	500
124-48-1	Chlorodibromomethane	140
67-66-3	Chloroform	0.1
218-01-9	Chrysene	7.5

CAS Number	Constituent	Class II (ug/L) (a)
156-59-2	cis-1,2-Dichloroethylene	200
75-99-0	Dalapon	2000
72-54-8	DDD	0.55
72-55-9	DDE	0.2
50-29-3	DDT	0.6
53-70-3	Dibenzo(a,h)anthracene	1.5
60-57-1	Dieldrin	0.1
84-66-2	Diethyl phthalate	5600
84-74-2	Di-n-butyl phthalate	3500
117-84-0	Di-n-octyl phthalate	700
88-85-7	Dinoseb	70
115-29-7	Endosulfan	210
145-73-3	Endothall	100
72-20-8	Endrin	10
100-41-4	Ethylbenzene	1000
206-44-0	Fluoranthene	1400
86-73-7	Fluorene	1400
58-89-9	gamma-HCH (Lindane)	1
76-44-8	Heptachlor	2
1024-57-3	Heptachlor epoxide	1
118-74-1	Hexachlorobenzene	0.3
77-47-4	Hexachlorocyclopentadiene	500
67-72-1	Hexachloroethane	35
193-39-5	Indeno(1,2,3-c,d)pyrene	2.15
78-59-1	Isophorone	1400
72-43-5	Methoxychlor	200
74-83-9	Methyl bromide (Bromomethane)	49
75-09-2	Methylene chloride (Dichloromethane)	50
91-20-3	Naphthalene	39
98-95-3	Nitrobenzene	3.5
621-64-7	N-Nitrosodi-n-propylamine	10
122-39-4	N-Nitrosodiphenylamine	50
87-86-5	Pentachlorophenol	5
108-95-2	Phenol	100
1918-02-1	Picloram	5000
1336-36-3	Polychlorinated biphenyls (PCBs)	2.5
129-00-0	Pyrene	1050
122-34-9	Simazine	40
100-42-5	Styrene	500
127-18-4	Tetrachloroethylene (Perchloroethylene)	25
108-88-3	Toluene	2500
8001-35-2	Toxaphene	15
156-60-5	trans-1,2-Dichloroethylene	500
79-01-6	Trichloroethylene	25
108-05-4	Vinyl acetate	7000
75-01-4	Vinyl chloride	10
1330-20-7	Xylenes (total)	10000

CAS Number	Constituent	Class II (ug/L) (a)	
	Inorganics		
7440-36-0	Antimony	24	
7440-38-2	Arsenic	200	
7440-39-3	Barium	2000	
7440-41-7	Beryllium	500	
7440-42-8	Boron	2000	
7440-43-9	Cadmium	50	
16887-00-6	Chloride	200000	
18540-29-9	Chromium, ion, hexavalent	NA	
7440-47-3	Chromium, total	1000	
7440-48-4	Cobalt	1000	
7440-50-8	Copper	650	
57-12-5	Cyanide	600	
7782-41-4	Fluoride	4000	
7439-89-6	Iron	5000	
7439-92-1	Lead	100	
7439-96-5	Manganese	10000	
7439-97-6	Mercury	10	
7440-02-0	Nickel	2000	
14797-55-8	Nitrate as N	100000	
7782-49-2	Selenium	50	
7440-22-4	Silver	50	
14808-79-8	Sulfate	400000	
7440-28-0	Thallium	20	
7440-62-2	Vanadium	49	
7440-66-6	Zinc	10000	
	Constituents Lacking TACO Standards		
79-34-5	1,1,2,2-Tetrachloroethane	0.055	(n)
541-73-1	1,3-Dichlorobenzene	1500	(b)
93-76-5	2,4,5-T	360	(n)
94-82-6	2,4-DB	290	(n)
91-58-7	2-Chloronaphthalene	490	(n)
91-57-6	2-Methylnaphthalene	39	(c)
88-74-4	2-Nitroaniline	2.1	(n)
106-44-5	3-Methylphenol/4-Methylphenol	350	(d)
108-10-1	4-Methyl-2-pentanone (MIBK)	160	(n)
100-01-6	4-Nitroaniline	2.1	(n)
5103-71-9	Alpha Chlordane	10	(e)
7429-90-5	Aluminum	36000	(n)
191-24-2	Benzo(g,h,i)perylene	1050	(f)
319-85-7	beta-BHC	0.15	(g)
86-74-8	Carbazole	3.4	(n)
540-59-0	Cis/Trans-1,2-Dichloroethene	200	(h)
319-86-8	delta-BHC	0.15	(g)
132-64-9	Dibenzofuran	24	(n)
1918-00-9	Dicamba	1100	(n)
120-36-5	Dichloroprop	NA	(l)
131-11-3	Dimethylphthalate	360000	(n)
1746-01-6	Dioxin	0.00003	(m)
959-98-8	Endosulfan I	210	(i)
33213-65-9	Endosulfan II	210	(i)
7421-93-4	Endrin aldehyde	10	(j)
53494-70-5	Endrin ketone	10	(j)

CAS Number	Constituent	Class II (ug/L) (a)	
5103-74-2	Gamma Chlordane	10	(e)
93-65-2	MCPP	36	(n)
7439-98-7	Molybdenum	180	(n)
85-01-8	Phenanthrene	10500	(k)

Notes:
CAS - Chemical Abstracts Service.
NA - Not Available.
ND - Not Determined.
TACO - Illinois Tiered Approach to Corrective Action.
(a) - Title 35, Subtitle G, Chapter I, Part 742 Illinois Tiered Approach to Corrective Action Objectives (TACO) Tier 1 values from Appendix B, Table E.
(b) - No TACO value available. Therefore, the TACO value for 1,2-dichlorobenzene has been used due to structural similarity.
(c) - No TACO value available. Therefore, the TACO value for naphthalene has been used due to structural similarity.
(d) - No TACO value available. Therefore, the TACO value for 2-methylphenol has been used due to structural similarity.
TACO - Ilinois Tiered Approach to Corrective Action.
(f) - No TACO value available. Therefore, the TACO value for pyrene has been used due to structural similarity.
(g) - No TACO value available. Therefore, the TACO value for alpha-HCH has been used due to structural similarity.
(h) - TACO value for cis-1,2-dichloroethylene.
(i) - No TACO value available. Therefore, the TACO value for endosulfan has been used due to structural similarity.
(j) - No TACO value available. Therefore, the TACO value for endrin has been used due to structural similarity.
(k) - No TACO value available. Therefore, the TACO value for anthracene has been used due to structural similarity.
(l) - No TACO value, PRG value, appropriate surrogate, or dose response value available.
(m) - Drinking Water Standards and Health Adivories. Office of Water, EPA 822-B00-001, Summer 2000. Maximum Contaminant Level (MCL).
(n) - No TACO value, and no appropriate structural surrogate. Therefore, Region IX Preliminary Remediation Goal (PRG), October 1, 1999, used.

Table C-5
Screening Criteria for Constituents Detected in Air
Sauget Area 1 EE/CA and RI/FS
Human Health Risk Assessment

CAS Number	Constituent	PRG (ug/m3) (a)	
71-55-6	1,1,1-Trichloroethane	1000	
75-35-4	1,1-Dichloroethene	0.038	
78-93-3	2-Butanone	1000	
108-10-1	4-Methyl-2-pentanone	83	
67-64-1	Acetone	370	
100-41-4	Ethylbenzene	1100	
98-82-8	Isopropylbenzene	400	
1330-20-7	m&p-Xylene	730	
75-09-2	Methylene chloride	4.1	
104-51-8	n-Butylbenzene	36.5	
95-47-6	o-Xylene	730	
99-87-6	p-Isopropyltoluene	730	(b)
135-98-8	s-Butylbenzene	36.5	
100-42-5	Styrene	1100	
98-06-6	t-Butylbenzene	36.5	
127-18-4	Tetrachloroethene	3.3	
108-88-3	Toluene	400	
79-01-6	Trichloroethene	1.1	

Notes:
CAS - Chemical Abstracts Service.
PRG - Preliminary Remediation Goal.
(a) - U.S. EPA Region IX Preliminary Remediation Goal (PRG), October 1, 1998.
(b)- No PRG value available. Therefore, the PRG value for xylenes has been used due to structural similarity.

Table C-6
Fish Tissue Standards
Sauget Area 1 EE/CA and RI/FS
Human Health Risk Assessment

CAS Numl	Constituent	RBC (mg/kg) (a)	
72-55-9	4,4'-DDE	0.009	
7440-38-2	Arsenic	0.002	
117-81-7	bis(2-Ethylhexyl)phthalate	0.23	
7440-47-3	Chromium	2028	(b)
7440-50-8	Copper	54	
84-74-2	Di-n-butylphthalate	135	
1746-01-6	Dioxin	0.000025	(c)
5103-74-2	Gamma Chlordane	0.009	(d)
7439-97-6	Mercury	0.14	(e)
7440-66-6	Zinc	406	

Notes:
CAS - Chemical Abstracts Service.
RBC - Risk-Based Concentration.
(a) - U.S. EPA Region III Risk-Based Concentration (RBC) Table, October 5, 2000. Value for fish tissue.
(b) - Value for Chromium III.
(c) - Food and Drug Administration (FDA) Action Level; as reported in:
USEPA. 1984. Ambient Water Quality Criteria Document for 2,3,7,8-Tetrachlorodibenzo-p-dioxin. EPA 440/5-84-007.
Cordel, Frank. 1981. The Use of Epidemiology in The Regulation of Dioxins in The Food Supply. Regulatory Toxicology and Pharmacology 1:379-387.
(d) - Value for Chlordane.
(e) - Value for Methyl Mercury.

TABLE C-7
CALCULATIONS OF TIER 1 TACO STANDARDS FOR BERYLLIUM
USE OF CURRENT USEPA DOSE-RESPONSE VALUES
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

PARAMETER	RESIDENTIAL		INDUSTRIAL/ COMMERCIAL	CONSTRUCTION WORKER
	Noncarcinogen	Carcinogen		
AT ing (yr)	6.00	--	25.00	0.115
AT inh (yr)	30.00	--	25.00	0.115
ATc (yr)	--	70.00	70.00	70.00
BW (kg)	15.00	70.00	70.00	70.00
CONV(KG/MG)	1.00E-06	1.00E-06	1.00E-06	1.00E-06
CONV(UG/MG)	1.00E+03	1.00E+03	1.00E+03	1.00E+03
ED ing(yr)	6.00	--	25.00	1.00
ED inh(yr)	30.00	30.00	25.00	1.00
EF (d/yr)	350.00	350.00	250.00	30.00
IRsoil (mg/d)	200.00	--	50.00	480.00
PEF (m^3/kg)	1.32E+09	1.32E+09	1.24E+09	--
PEF' (m^3/kg)	--	--	--	1.24E+08
RfC (mg/m^3)	2.00E-05	--	2.00E-05	2.00E-05
RfDo (mg/(kg-d))	2.00E-03	--	2.00E-03	2.00E-03
THQ	1.00	--	1.00	1.00
TR	--	1.00E-06	1.00E-06	1.00E-06
URF (ug/m3)^-1	--	2.40E-03	2.40E-03	2.40E-03
YR(d/yr)	365.00	365.00	365.00	365.00
INGESTION:				
NONCARCINOGENIC	1.56E+02	--	4.09E+03	4.08E+02
INHALATION				
NONCARCINOGENIC	2.75E+04	--	3.62E+04	3.47E+03
CARCINOGENIC	--	1.34E+03	2.11E+03	4.40E+04

-- = Not Applicable
TACO - Tiered Approach to Corrective Action Objectives. Part 742, Subchapter F, Chapter I, Subtitle G, Title 35 of the Illinois Regulations, effective June 8, 1998.

EQUATION FOR SOIL INGESTION EXPOSURE ROUTE
NONCARCINOGENIC (MG/KG):

$$\frac{THQ \cdot BW \cdot AT\ ing \cdot YR}{(1/RfDo) \cdot CONV\ (kg/mg) \cdot EF \cdot ED\ ing \cdot IRsoil}$$

EQUATION FOR INHALATION EXPOSURE ROUTE

NONCARCINOGENIC (MG/KG):
RESIDENTIAL, INDUSTRIAL/COMMERCIAL

$$\frac{THQ \cdot AT\ inh \cdot YR}{EF \cdot ED\ inh \cdot (1/RfC) \cdot (1/PEF)}$$

CONSTRUCTION WORKER

$$\frac{THQ \cdot AT\ inh \cdot YR}{EF \cdot ED\ inh \cdot (1/RfC) \cdot (1/PEF')}$$

CARCINOGENIC (MG/KG):
RESIDENTIAL, INDUSTRIAL/COMMERCIAL

$$\frac{TR \cdot ATc \cdot YR}{URF \cdot CONV(UG/MG) \cdot EF \cdot ED\ inh \cdot (1/PEF)}$$

CONSTRUCTION WORKER

$$\frac{TR \cdot ATc \cdot YR}{URF \cdot CONV(UG/MG) \cdot EF \cdot ED\ inh \cdot (1/PEF')}$$

APPENDIX D

BACKGROUND CALCULATIONS

APPENDIX D
BACKGROUND CALCULATIONS

This appendix presents the concentrations to be used as background for constituents detected in background samples collected for:

- Table D-1 Subsurface Soil
- Table D-2 Surface Soil
- Table D-3 Sediment
- Table D-4 Surface Water
- Table D-5 Groundwater

Background is calculated as described in the USEPA-approved workplan for the Human Health Risk Assessment for Sauget Area 1 (presented in Appendix A), following USEPA Region 4 (2000) guidance. The background concentration is defined as two times the arithmetic mean site-specific background concentration.

Background calculations for fish tissue are presented in Appendix I, with the fish tissue screening table. Background data for air are presented in Appendix J.

Reference

USEPA. 2000. Region 4 Human Health Risk Assessment Bulletins - - Supplement to RAGS. USEPA Region 4. Atlanta, GA. Update 05/30/00.

[URL: http://www.epa.gov/region4/waste/oftecser/healthbul.htm]

TABLE D-1
SUMMARY STATISTICS AND CALCULATION OF BACKGROUND CONCENTRATIONS - SUBSURFACE SOIL
SAUGET AREA 1 EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Units	Frequency of Detection			Summary Statistics			Calculated Background Concentration (a)
		Total # Samples (b)	# Detects	% Detected	Minimum	Average	Maximum	
2,4,5-TP (Silvex)	ug/kg	3	1	33%	4.90E+00	5.40E+00	5.80E+00	1.08E+01
Acetone	ug/kg	3	1	33%	5.50E+00	5.50E+00	5.50E+00	1.10E+01
Aluminum	mg/kg	3	3	100%	8.40E+03	1.01E+04	1.20E+04	2.03E+04
Antimony	mg/kg	1	1	100%	1.20E+00	1.20E+00	1.20E+00	2.40E+00
Arsenic	mg/kg	3	3	100%	6.80E+00	8.70E+00	1.20E+01	1.74E+01
Barium	mg/kg	3	3	100%	1.70E+02	1.87E+02	2.00E+02	3.73E+02
Benzo(a)anthracene	ug/kg	3	1	33%	2.60E+01	2.60E+01	2.60E+01	5.20E+01
Benzo(g,h,i)perylene	ug/kg	3	1	33%	3.40E+01	3.40E+01	3.40E+01	6.80E+01
Beryllium	mg/kg	3	3	100%	5.00E-01	6.33E-01	7.20E-01	1.27E+00
Cadmium	mg/kg	3	3	100%	1.10E-01	3.44E+00	8.90E+00	6.87E+00
Calcium	mg/kg	3	3	100%	3.80E+03	8.07E+03	1.20E+04	1.61E+04
Chromium	mg/kg	3	3	100%	1.30E+01	1.63E+01	1.80E+01	3.27E+01
Chrysene	ug/kg	3	1	33%	4.20E+01	4.20E+01	4.20E+01	8.40E+01
Cobalt	mg/kg	3	3	100%	6.40E+00	6.97E+00	7.70E+00	1.39E+01
Copper	mg/kg	3	3	100%	1.10E+01	7.73E+01	1.80E+02	1.55E+02
Diethylphthalate	ug/kg	3	2	67%	6.30E+01	9.27E+01	1.10E+02	1.85E+02
Fluoranthene	ug/kg	3	1	33%	4.20E+01	4.20E+01	4.20E+01	8.40E+01
Iron	mg/kg	3	3	100%	1.40E+04	1.67E+04	1.80E+04	3.33E+04
Lead	mg/kg	3	3	100%	8.50E+00	7.12E+01	1.60E+02	1.42E+02
Magnesium	mg/kg	3	3	100%	3.10E+03	4.67E+03	5.70E+03	9.33E+03
Manganese	mg/kg	3	3	100%	3.70E+02	4.00E+02	4.20E+02	8.00E+02
MCPP	ug/kg	3	2	67%	1.20E+03	2.37E+03	3.00E+03	4.73E+03
Mercury	mg/kg	3	3	100%	4.10E-03	2.80E-02	6.00E-02	5.61E-02
Methylene chloride	ug/kg	3	1	33%	1.40E+00	1.40E+00	1.40E+00	2.80E+00
Molybdenum	mg/kg	3	3	100%	5.00E-01	8.73E-01	1.50E+00	1.75E+00
Nickel	mg/kg	3	3	100%	1.60E+01	1.87E+01	2.00E+01	3.73E+01
Potassium	mg/kg	3	3	100%	1.80E+03	2.10E+03	2.30E+03	4.20E+03
Silver	mg/kg	3	1	33%	5.50E-01	6.93E-01	9.80E-01	1.39E+00
Sodium	mg/kg	3	1	33%	6.00E+01	1.77E+02	4.10E+02	3.53E+02
Total 2,3,7,8-TCDD-TEQ	ug/kg	3	3	100%	1.60E-04	6.89E-04	1.55E-03	1.38E-03
Vanadium	mg/kg	3	3	100%	2.50E+01	2.90E+01	3.10E+01	5.80E+01
Zinc	mg/kg	3	3	100%	4.20E+01	3.21E+02	7.70E+02	6.41E+02

Notes:
(a) - Background as defined in the Human Health Risk Assessment Workplan for Sauget Area 1 is two times the average concentration in the background or reference samples (U.S. EPA, Region 4, 2000.)
(b) - Samples BS-EE-04-3-6FT, BS-EE-20-3-6FT, and BS-EEG-108-3-6FT.

Constituent	Units	Frequency of Detection			Summary Statistics			Calculated Background Concentration (a)
		Total # Samples (c)	# Detects	% Detected	Minimum	Average	Maximum	
2,4,5-TP (Silvex)	ug/kg	3	3	100%	5.80E+00	8.68E+00	1.10E+01	1.74E+01
2-Hexanone	ug/kg	3	1	33%	1.45E+01	1.65E+01	1.80E+01	3.30E+01
4,4'-DDE	ug/kg	3	1	33%	2.00E+00	8.06E+00	2.00E+01	1.61E+01
4,4'-DDT	ug/kg	3	1	33%	2.00E+00	7.06E+00	1.70E+01	1.41E+01
Aluminum	mg/kg	3	3	100%	8.10E+03	1.27E+04	1.90E+04	2.54E+04
Anthracene	ug/kg	3	1	33%	8.00E+01	8.00E+01	8.00E+01	1.60E+02
Antimony	mg/kg	1	1	100%	1.90E+00	1.90E+00	1.90E+00	3.80E+00
Arsenic	mg/kg	3	3	100%	6.60E+00	9.57E+00	1.30E+01	1.91E+01
Barium	mg/kg	3	3	100%	1.10E+02	1.82E+02	2.35E+02	3.63E+02
Benzo(a)anthracene	ug/kg	3	2	67%	7.70E+01	1.20E+02	1.70E+02	2.40E+02
Benzo(a)pyrene	ug/kg	3	2	67%	6.00E+01	9.33E+01	1.50E+02	1.87E+02
Benzo(b)fluoranthene	ug/kg	3	2	67%	6.90E+01	8.95E+01	1.10E+02	1.79E+02
Benzo(g,h,i)perylene	ug/kg	3	2	67%	4.50E+01	6.35E+01	8.20E+01	1.27E+02
Benzo(k)fluoranthene	ug/kg	3	2	67%	6.00E+01	1.04E+02	1.40E+02	2.08E+02
Beryllium	mg/kg	3	3	100%	4.50E-01	7.53E-01	1.10E+00	1.51E+00
bis(2-Ethylhexyl)phthalate	ug/kg	3	2	67%	1.05E+02	1.61E+02	2.68E+02	3.22E+02
Cadmium	mg/kg	3	3	100%	5.20E-01	4.32E+00	9.40E+00	8.65E+00
Calcium	mg/kg	3	3	100%	4.00E+03	1.68E+04	4.00E+04	3.35E+04
Carbazole	ug/kg	3	1	33%	3.20E+01	3.20E+01	3.20E+01	6.40E+01
Chromium	mg/kg	3	3	100%	1.70E+01	1.97E+01	2.50E+01	3.93E+01
Chrysene	ug/kg	3	2	67%	9.70E+01	1.37E+02	2.00E+02	2.73E+02
Cobalt	mg/kg	3	3	100%	5.50E+00	7.77E+00	1.04E+01	1.55E+01
Copper	mg/kg	3	3	100%	3.50E+01	1.05E+02	1.90E+02	2.09E+02
Diethylphthalate	ug/kg	3	3	100%	6.00E+01	9.33E+01	1.10E+02	1.87E+02
Di-n-butylphthalate	ug/kg	3	2	67%	1.05E+02	1.56E+02	2.40E+02	3.12E+02
Fluoranthene	ug/kg	3	2	67%	1.13E+02	2.51E+02	4.40E+02	5.02E+02
Iron	mg/kg	3	3	100%	1.50E+04	1.90E+04	2.50E+04	3.80E+04
Lead	mg/kg	3	3	100%	2.40E+01	9.25E+01	1.80E+02	1.85E+02
Magnesium	mg/kg	3	3	100%	3.20E+03	8.62E+03	1.70E+04	1.72E+04
Manganese	mg/kg	3	3	100%	3.90E+02	4.42E+02	5.35E+02	8.83E+02
MCPA	ug/kg	3	3	100%	4.30E+03	7.25E+03	1.30E+04	1.45E+04
MCPP	ug/kg	3	3	100%	2.50E+03	4.98E+03	6.55E+03	9.97E+03
Mercury	mg/kg	3	3	100%	4.40E-02	8.87E-02	1.40E-01	1.77E-01
Methylene chloride	ug/kg	3	2	67%	1.70E+00	5.69E+00	1.20E+01	1.14E+01
Molybdenum	mg/kg	3	3	100%	7.20E-01	1.01E+00	1.40E+00	2.02E+00
Nickel	mg/kg	3	3	100%	1.50E+01	2.13E+01	2.80E+01	4.27E+01
Pentachlorophenol	ug/kg	3	2	67%	2.55E+02	3.71E+02	5.61E+02	(b)
Phenanthrene	ug/kg	3	2	67%	1.00E+02	1.68E+02	2.90E+02	3.35E+02
Potassium	mg/kg	3	3	100%	1.30E+03	2.37E+03	3.50E+03	4.73E+03
Pyrene	ug/kg	3	2	67%	1.13E+02	2.18E+02	3.60E+02	4.35E+02
Silver	mg/kg	3	2	67%	3.25E-01	6.75E-01	1.10E+00	1.35E+00
Sodium	mg/kg	3	1	33%	5.00E+01	2.88E+02	7.50E+02	5.77E+02
Total 2,3,7,8-TCDD-TEQ	ug/kg	3	3	100%	4.72E-03	6.19E-02	1.72E-01	1.24E-01
Total PCBs	ug/kg	3	2	67%	1.00E+01	6.00E+02	1.71E+03	(b)
Vanadium	mg/kg	3	3	100%	2.80E+01	3.45E+01	4.45E+01	6.90E+01
Zinc	mg/kg	3	3	100%	8.20E+01	4.04E+02	8.20E+02	8.08E+02

Notes:
(a) - Background as defined in the Human Health Risk Assessment Workplan for Sauget Area 1 is two times the average concentration in the background or reference samples (U.S. EPA, Region 4, 2000.)
(b) - Background concentration not calculated.
(c) - Samples BS-EE-04-0-0.5FT, BS-EE-20-0-0.5FT, and BS-EEG-108-0-0.5FT.

TABLE D-3
SUMMARY STATISTICS AND CALCULATION OF BACKGROUND CONCENTRATIONS - SEDIMENT
SAUGET AREA 1 EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Units	Frequency of Detection: Total # Samples (b)	# Detects	% Detected	Summary Statistics: Minimum	Average	Maximum	Calculated Background Concentration (a)
2,4-D	ug/kg	4	1	25%	8.50E+00	1.01E+01	1.20E+01	2.03E+01
2-Butanone (MEK)	ug/kg	4	3	75%	1.40E+01	2.49E+01	4.00E+01	4.99E+01
Acetone	ug/kg	4	3	75%	4.75E+01	7.78E+01	1.60E+02	1.56E+02
Aluminum	mg/kg	4	4	100%	1.20E+04	1.45E+04	1.90E+04	2.90E+04
Antimony	mg/kg	3	2	67%	1.30E+00	1.38E+00	1.45E+00	2.75E+00
Arsenic	mg/kg	4	4	100%	6.70E+00	7.18E+00	8.00E+00	1.44E+01
Barium	mg/kg	4	4	100%	1.65E+02	2.06E+02	2.30E+02	4.13E+02
Beryllium	mg/kg	4	4	100%	6.20E-01	7.80E-01	1.00E+00	1.56E+00
Cadmium	mg/kg	4	4	100%	2.90E-01	4.15E-01	6.50E-01	8.30E-01
Calcium	mg/kg	4	4	100%	1.20E+04	1.35E+04	1.80E+04	2.70E+04
Chromium	mg/kg	4	4	100%	1.70E+01	2.00E+01	2.50E+01	4.00E+01
Cobalt	mg/kg	4	4	100%	7.10E+00	8.60E+00	1.00E+01	1.72E+01
Copper	mg/kg	4	4	100%	1.60E+01	1.90E+01	2.30E+01	3.80E+01
Iron	mg/kg	4	4	100%	1.75E+04	2.06E+04	2.40E+04	4.13E+04
Lead	mg/kg	4	4	100%	1.65E+01	2.19E+01	2.60E+01	4.38E+01
Magnesium	mg/kg	4	4	100%	3.25E+03	5.14E+03	6.50E+03	1.03E+04
Manganese	mg/kg	4	4	100%	5.70E+02	7.08E+02	7.70E+02	1.42E+03
Mercury	mg/kg	4	4	100%	4.00E-02	4.80E-02	6.30E-02	9.60E-02
Molybdenum	mg/kg	4	4	100%	3.70E-01	4.45E-01	5.30E-01	8.90E-01
Nickel	mg/kg	4	4	100%	1.75E+01	2.14E+01	2.60E+01	4.28E+01
Pentachlorophenol	ug/kg	4	1	25%	3.76E+02	3.76E+02	3.76E+02	7.52E+02
Potassium	mg/kg	4	4	100%	1.60E+03	2.10E+03	2.60E+03	4.20E+03
Total 2,3,7,8-TCDD-TEQ	ug/kg	4	4	100%	5.38E-03	6.22E-03	7.60E-03	1.24E-02
Total Organic Carbon	mg/kg	4	4	100%	1.20E+04	1.70E+04	2.30E+04	3.40E+04
Vanadium	mg/kg	4	4	100%	2.95E+01	3.49E+01	4.40E+01	6.98E+01
Zinc	mg/kg	4	4	100%	5.90E+01	8.30E+01	9.60E+01	1.66E+02

Notes:
(a) - Background as defined in the Human Health Risk Assessment Workplan for Sauget Area 1 is two times the average concentration in the background or reference samples (U.S. EPA, Region 4, 2000.)
(b) - Samples SED-RA1-S1-0.2FT, SED-RA1-S2-0.2FT, SED-RA2-S1-0.2FT and SED-RA2-S2-0.2FT.

TABLE D-4
SUMMARY STATISTICS AND CALCULATION OF BACKGROUND CONCENTRATIONS - SURFACE WATER
SAUGET AREA 1 EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Frequency of Detection			Summary Statistics (ug/L)			Calculated Background Concentration (ug/L)(a)
	Total # Samples (b)	# Detects	% Detected	Minimum	Mean	Maximum	
3,3'-Dichlorobenzidine	4	1	25%	5.00E+00	5.00E+00	5.00E+00	1.00E+01
4,4'-DDE	4	1	25%	1.50E-03	1.50E-03	1.50E-03	3.00E-03
4,4'-DDT	4	1	25%	5.70E-03	5.70E-03	5.70E-03	1.14E-02
Acetone	4	1	25%	2.50E+01	2.51E+01	2.55E+01	5.03E+01
Aldrin	4	2	50%	2.40E-03	3.20E-03	4.00E-03	6.40E-03
Alpha Chlordane	4	2	50%	1.90E-03	7.45E-03	1.30E-02	1.49E-02
alpha-BHC	4	1	25%	1.55E-03	1.55E-03	1.55E-03	3.10E-03
Aluminum	4	4	100%	9.40E+03	1.32E+04	1.95E+04	2.65E+04
Arsenic	4	4	100%	9.30E+00	1.46E+01	1.70E+01	2.92E+01
Barium	4	4	100%	3.20E+02	3.59E+02	4.10E+02	7.18E+02
Beryllium	4	2	50%	6.65E-01	7.48E-01	8.30E-01	1.50E+00
beta-BHC	4	4	100%	4.80E-03	1.08E-02	1.50E-02	2.15E-02
Calcium	4	4	100%	5.00E+04	5.86E+04	7.20E+04	1.17E+05
Chromium	4	4	100%	1.10E+01	1.54E+01	2.25E+01	3.08E+01
Cobalt	4	4	100%	4.70E+00	5.70E+00	7.60E+00	1.14E+01
Copper	4	4	100%	9.70E+00	1.23E+01	1.85E+01	2.46E+01
delta-BHC	4	4	100%	6.00E-03	6.25E-03	7.00E-03	1.25E-02
Dieldrin	4	2	50%	2.10E-03	2.85E-03	3.60E-03	5.70E-03
Endosulfan I	4	4	100%	1.70E-03	6.98E-03	1.35E-02	1.40E-02
Endosulfan II	4	1	25%	9.60E-05	9.60E-05	9.60E-05	1.92E-04
Endosulfan sulfate	4	3	75%	2.80E-03	4.63E-03	7.00E-03	9.27E-03
Endrin	4	2	50%	4.80E-04	2.94E-03	5.40E-03	5.88E-03
Endrin aldehyde	4	1	25%	2.62E-02	2.62E-02	2.62E-02	5.23E-02
Endrin ketone	4	2	50%	4.70E-03	7.85E-03	1.10E-02	1.57E-02
Gamma Chlordane	4	2	50%	8.20E-04	1.96E-03	3.10E-03	3.92E-03
gamma-BHC (Lindane)	4	4	100%	1.00E-03	5.25E-03	6.80E-03	1.05E-02
Heptachlor	4	1	25%	3.50E-03	3.50E-03	3.50E-03	7.00E-03
Heptachlor epoxide	4	4	100%	4.70E-03	5.93E-03	8.20E-03	1.19E-02
Iron	4	4	100%	1.10E+04	1.64E+04	2.55E+04	3.28E+04
Lead	4	4	100%	2.00E+01	2.58E+01	3.20E+01	5.15E+01
Magnesium	4	4	100%	2.30E+04	2.68E+04	3.50E+04	5.35E+04
Manganese	4	4	100%	1.50E+03	1.98E+03	2.90E+03	3.95E+03
Molybdenum	4	4	100%	3.20E+00	5.36E+00	6.55E+00	1.07E+01
Nickel	4	4	100%	1.30E+01	1.74E+01	2.45E+01	3.48E+01
Potassium	4	4	100%	7.00E+03	8.50E+03	1.10E+04	1.70E+04
Sodium	4	4	100%	1.60E+04	1.90E+04	2.30E+04	3.80E+04
Total 2,3,6,7-TCDD TEQ	4	4	100%	4.78E-06	1.34E-05	1.88E-05	2.67E-05
Vanadium	4	4	100%	3.10E+01	4.24E+01	5.25E+01	8.48E+01
Zinc	4	4	100%	4.20E+01	7.59E+01	1.30E+02	1.52E+02

Notes:
(a) - Background as defined in the Human Health Risk Assessment Workplan for Sauget Area 1 is two times the average concentration in the background or reference samples (U.S. EPA, Region 4, 2000.)
(b) - Samples SW-RA1-S1, SW-RA1-S2, SW-RA2-S1, and SW-RA2-S2.

TABLE D-5
SUMMARY STATISTICS AND CALCULATION OF BACKGROUND CONCENTRATIONS - GROUNDWATER
SAUGET AREA 1 EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Frequency of Detection			Summary Statistics (ug/L)			Calculated Background
	Total # Samples (b)	# Detects	% Detected	Minimum	Mean	Maximum	Concentration (ug/L)(a)
2,4,5-T	3	1	33%	2.10E-01	2.10E-01	2.10E-01	4.20E-01
2,4,5-TP (Silvex)	3	1	33%	1.60E-01	1.60E-01	1.60E-01	3.20E-01
Arsenic	3	1	33%	5.00E+00	5.85E+00	7.55E+00	1.17E+01
Barium	3	3	100%	1.10E+02	3.08E+02	5.45E+02	6.17E+02
Calcium	3	3	100%	1.00E+05	2.13E+05	3.30E+05	4.27E+05
Carbon disulfide	3	1	33%	2.50E+00	4.25E+00	7.75E+00	8.50E+00
Chromium	3	2	67%	5.00E+00	5.23E+01	1.25E+02	1.05E+02
Cobalt	3	1	33%	5.00E+00	5.72E+00	7.15E+00	1.14E+01
delta-BHC	3	1	33%	6.00E-03	6.25E-03	6.75E-03	1.25E-02
Dibenzofuran	3	1	33%	3.60E-01	3.60E-01	3.60E-01	7.20E-01
Diethylphthalate	3	1	33%	3.50E-01	3.50E-01	3.50E-01	7.00E-01
Endosulfan sulfate	3	1	33%	2.55E-02	2.55E-02	2.55E-02	5.10E-02
Endrin ketone	3	1	33%	2.61E-02	2.61E-02	2.61E-02	5.21E-02
Fluorene	3	1	33%	2.40E-01	2.40E-01	2.40E-01	4.80E-01
gamma-BHC (Lindane)	3	1	33%	5.06E-03	5.06E-03	5.06E-03	1.01E-02
Heptachlor	3	2	67%	1.30E-02	1.30E-02	1.30E-02	2.60E-02
Heptachlor epoxide	3	1	33%	1.33E-02	1.33E-02	1.33E-02	2.66E-02
Iron	3	3	100%	7.30E+01	1.10E+04	3.20E+04	2.20E+04
Magnesium	3	3	100%	2.30E+04	4.62E+04	6.20E+04	9.23E+04
Manganese	3	3	100%	7.40E+01	8.75E+02	1.35E+03	1.75E+03
Nickel	3	3	100%	7.00E+00	6.49E+01	1.75E+02	1.30E+02
N-Nitrosodiphenylamine	3	1	33%	2.50E-01	2.50E-01	2.50E-01	5.00E-01
Potassium	3	3	100%	2.50E+03	6.15E+04	1.70E+05	1.23E+05
Sodium	3	3	100%	8.50E+03	6.52E+04	1.00E+05	1.30E+05
Total 2,3,6,7-TCDD TEQ	3	3	100%	3.88E-08	2.51E-07	3.74E-07	5.02E-07

Notes:
(a) - Background as defined in the Human Health Risk Assessment Workplan for Sauget Area 1 is two times the average concentration in the background or reference samples (U.S. EPA, Region 4, 2000.)
(b) - Samples UGGW-EE-04, UGGW-EE-20, and UGGW-EEG-108.

TABLE D-6
COMPARISON OF TRANSECT SURFACE SOIL DATA TO BACKGROUND LEVELS OF PAHS IN NEW ENGLAND SOILS
SAUGET AREA 1 EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	TACO Tier I Residential Soil Value (a) (mg/kg)	Transect 3 Average (mg/kg)	Transect 3 Maximum (mg/kg)	Transect 4 Average (mg/kg)	Transect 4 Maximum (mg/kg)	Transect 5 Average (mg/kg)	Transect 5 Maximum (mg/kg)	Transect 6 Average (mg/kg)	Transect 6 Maximum (mg/kg)	Transect 7 Average (mg/kg)	Transect 7 Maximum (mg/kg)	Range in New England Soils (b) Minimum (mg/kg)	Range in New England Soils (b) Maximum (mg/kg)	Range in New England Soils (b) Average (mg/kg)	Range in New England Soils (b) 95% UCL (mg/kg)
Benzo(a)anthracene	0.9	--	--	0.703	0.430	--	--	0.606	4.200	0.342	1.900	0.048	15.000	1.319	1.858
Benzo(a)pyrene	0.09	0.137	0.860	0.591	3.500	0.138	0.600	0.504	3.600	0.374	2.100	0.040	13.000	1.323	1.816
Benzo(b)fluoranthene	0.9	0.164	0.970	0.598	3.500	--	--	0.634	4.400	0.406	2.200	0.049	12.000	1.435	1.973
Dibenzo(a,h)anthracene	0.09	0.071	0.250	0.131	0.810	0.099	0.320	0.118	0.600	0.103	0.410	0.020	2.900	0.388	0.521
Indeno(1,2,3-cd)pyrene	0.9	--	--	0.355	2.000	--	--	0.220	1.100	0.240	1.100	0.093	6.000	0.987	1.293

Notes:
-- This PAH not a constituent of potential concern in this transect.
PAH - Polycyclic Aromatic Hydrocarbon.
TACO - Illinois Tiered Approach to Corrective Action Objectives.
(a) - See Table C-1 for references.
(b) - Background Levels of Polycyclic Aromatic Hydrocarbons (PAH) and Selected Metals in New England Urban Soils. L.J.N. Bradley, B.H. Magee, S.L. Allen. Journal of Soil Contamination, 3(4):349-361. 1994. Paper is included at the end of this appendix (D).

D-8

Journal of Soil Contamination, 3(4):349–361 (1994)

Background Levels of Polycyclic Aromatic Hydrocarbons (PAH) and Selected Metals in New England Urban Soils

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ABSTRACT: Polycyclic aromatic hydrocarbons (PAH) are byproducts of combustion and are ubiquitous in the urban environment. They are also present in industrial chemical wastes, such as coal tar, petroleum refinery sludges, waste oils and fuels, and wood-treating residues. Thus, PAHs are chemicals of concern at many waste sites. Risk assessment methods will yield risk-based cleanup levels for PAHs that range from 0.1 to 0.7 mg/kg. Given their universal presence in the urban environment, it is important to compare risk-based cleanup levels with typical urban background levels before utilizing unrealistically low cleanup targets. However, little data exist on PAH levels in urban, nonindustrial soils. In this study, 60 samples of surficial soils from urban locations in three New England cities were analyzed for PAH compounds. In addition, all samples were analyzed for total petroleum hydrocarbons (TPH) and seven metals. The upper 95% confidence interval on the mean was 3 mg/kg for benzo(*a*)pyrene toxic equivalents, 12 mg/kg for total potentially carcinogenic PAH, and 25 mg/kg for total PAH. The upper 95% confidence interval was 373 mg/kg for TPH, which exceeds the target level of 100 mg/kg used by many state regulatory agencies. Metal concentrations were similar to published background levels for all metals except lead. The upper 95% confidence interval for lead was 737 mg/kg in Boston, 463 mg/kg in Providence, and 378 mg/kg in Springfield.

KEY WORDS: background, PAH, metals, urban, anthropogenic, soil.

I. INTRODUCTION

Polycyclic aromatic hydrocarbons (PAHs) are byproducts of combustion and are naturally occurring chemicals in the environment. Forest fires and volcanoes are major natural sources of PAHs, but there are anthropogenic sources as well due to burning of fossil fuels, including automobile and industrial emissions. PAHs are chemicals of concern in many waste site investigations that are undertaken pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), and state

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hazardous waste programs. Risk assessments performed according to federal guidance for former manufactured gas plant sites, wood treating facilities, petroleum refineries, and other sites generally conclude that PAHs pose unreasonable risks to human health and that remedial actions must be taken to reduce risks to acceptable levels. The majority of the risk posed by PAHs is generally due to benzo(*a*)pyrene and the other PAHs that have been shown to cause cancer in laboratory animals after repeated dosings. The U.S. EPA (1993a) currently identifies seven PAHs as "probable human (B2) carcinogens": benzo(*a*)pyrene, benzo(*a*)anthracene, benzo(*b*)fluoranthene, benzo(*k*)fluoranthene, chrysene, dibenz(*a,h*)anthracene, and indeno(1,2,3-c,d)pyrene.

Because of the very health-protective assumptions used in regulatory risk assessments, very low risk-based clean-up levels for PAHs are derived for such sites. In Michigan, residential soil cleanup levels of 0.33 mg/kg for each carcinogenic PAH have been set (MDNR, 1993). In New Jersey, proposed residential soil clean-up levels are 0.66 mg/kg for benzo(*a*)pyrene (New Jersey *Register*, 1992). The use of standard CERCLA risk assessment guidance (U.S. EPA, 1993b) results in the derivation of a risk-based cleanup level for benzo(*a*)pyrene of 0.1 mg/kg.

All of these risk-based soil cleanup levels are below the urban, nonindustrial background soil concentrations presently reported in the literature. However, the availability of such data is very limited. Blumer (1961) reports that benzo(*a*)pyrene concentrations in Cape Cod, MA, soils range from 0.04 to 1.3 mg/kg. Menzie et al. (1992) report that urban background soil levels of total carcinogenic PAH range from 0.06 to 5.8 mg/kg. Butler et al. (1984) report that total PAH levels in soils alongside roadways in England range from 4 to 20 mg/kg, and potentially carcinogenic PAH range from 0.8 to 11.5 mg/kg. Blumer et al. (1977) report that total PAH levels in soils in a Swiss town range from 6 to 300 mg/kg.

It is very difficult to compare the data from these studies to the results of site risk assessments due to the limited dataset and the nonuniformity of the PAH compounds evaluated. Clearly, more data are required from nonindustrial urban locations to define the urban background level for PAH and to critically evaluate the role of risk assessment in setting remedial goals for PAH in soils. Accordingly, we have collected 60 samples of surficial soils from urban locations in three New England cities and analyzed them for all 17 PAH compounds present on the EPA's Target Compound List, which is used in the Superfund program. In addition, all samples were analyzed for total petroleum hydrocarbons (TPH) and for seven metals: arsenic, barium, cadmium, chromium, lead, mercury, and selenium.

II. METHODS

A. Sample Collection

Samples of surficial soils from urban locations in three New England cities were collected: Boston, MA; Providence, RI; and Springfield, MA. Twenty independent samples and duplicates of two samples were collected in each city. The samples were collected on July 21, 22, and 23, 1992, respectively. The samples were taken at a depth of 0 to 6 in. in areas considered to be not directly affected by industrial sites. Generally, the locations were along roads and sidewalks, and in parks and open lots. Each location was characterized in writing, including a soil description, and photographically documented. The samples were collected following standard environmental sampling protocols (U.S. EPA, 1986).

B. Sample Analysis

Chemical analysis of the samples was performed by AnalytiKEM, Inc. (Cherry Hill, NJ). The samples were analyzed by GC-MS for the 17 PAH compounds present on the EPA's Target Compound List using the methods required by EPA Method 8270 for the analysis of semivolatile compounds. In addition, the samples were analyzed for the eight RCRA metals, total petroleum hydrocarbons (TPH; EPA Method 418.1), and total solids. The complete analyte list is given in Table 1.

C. Data Validation

Validation of the data received from AnalytiKEM was performed according to U.S. EPA (1991) guidelines. The data were reviewed for completeness, holding times, GC-MS tuning and system performance, initial and continuing calibrations, laboratory method blank analysis, surrogate recoveries, matrix spike and matrix spike duplicate analysis, field duplication precision, and compound quantitation and detection limits.

D. Data Analysis

The analytical data were summarized in accordance with U.S. EPA (1989) risk assessment guidance. If a compound was detected at least once in surface soil, one half the sample quantitation limit (SQL) was used as a proxy concentration for all samples reported as "below detection limit" in the estimation of exposure point concentrations. However, if a compound was not detected in any sample, that compound was omitted from further consideration. In addition, when a proxy concentration (i.e., one half the detection limit) was greater than the highest actual detected value for a compound in any sample, that concentration was considered to be an aberration and was omitted from the database. This is consistent with U.S. EPA (1989) guidance, which recognizes that high sample quantitation limits can lead to unrealistic concentration estimates.

TABLE 1
Chemical Analyses of Urban Soils

Semivolatile Organics, EPA Target Compound List
Naphthalene
Acenaphthylene
Acenaphthene
Fluorene
Phenanthrene
Anthracene
Fluoranthene
Pyrene
Benzo(*a*)anthracene
Chrysene
Benzo(*b*)fluoranthene
Benzo(*k*)fluoranthene
Benzo(*a*)pyrene
Indeno(1,2,3-cd)pyrene
Dibenzo(*a,h*)anthracene
Benzo(*g,h,i*)perylene
2-Methylnaphthalene
Metals
Arsenic, total
Barium, total
Cadmium, total
Chromium, total
Lead, total
Mercury, total
Selenium, total
Silver, total
Other
Total petroleum hydrocarbons
Solids

A slightly different method of analysis was used to evaluate PAH. Because PAH are generally found in groups, it was conservatively assumed that if one PAH was detected in a sample, other compounds in that class might also be present in that sample. Therefore, if one PAH was detected in a sample, all undetected PAH were assigned a proxy concentration equal to one half the SQL. If a sample had no detected PAH, no PAH were assumed to be present in the sample, and a concentration of zero was used for all nondetects.

Summary statistics (minimum, maximum, arithmetic mean, upper 95% confidence limit on the arithmetic mean, and frequency of detection) were generated for each compound for each city and for all three cities combined.

The data for PAH were summarized in several different ways. Of the 17 PAH analyzed in each sample, seven are considered to be probable human carcinogens (Group B2) by the U.S. EPA (1993a). The U.S. EPA has derived a cancer slope factor, which is a measure of the carcinogenic potency of a compound, only for benzo(*a*)pyrene (B(*a*)P) (U.S. EPA, 1993a). Review of the literature indicates that not all PAH are equally potent with respect to tumor induction. Several researchers have proposed toxic equivalency schemes that relate the tumorigenic potency of each PAH to that of B(*a*)P (ICF-Clement Associates, 1988; Woo, 1989). B(*a*)P toxic equivalency factors (B(*a*)P-TEFs) can be used to adjust either the B(*a*)P dose-response value to provide a compound-specific dose-response value, or the concentration of each PAH in a sample to be expressed in terms of B(*a*)P toxic equivalents (B(*a*)P-TE). The latter method was used here. B(*a*)P-TE were calculated using the B(*a*)P toxic equivalency factors recommended for use by the U.S. EPA (1993c), as shown in Table 2. For each sample, PAH concentrations were reported for each of the 17 PAH on the analyte list, for total PAH (tPAH), for total carcinogenic PAH (cPAH), and for B(*a*)P-TE, and these values were used to generate the summary statistics for each group of samples.

III. RESULTS

Analysis of the laboratory results for the PAH indicates that quality control criteria were acceptable. The data were analyzed to determine if any statistically significant differences existed between the datasets for the three cities. A Hartley test for homogeneity of variances (Mendenhall, 1979) and a one-factor analysis of variance to test for equality of the means (Mendenhall, 1979) indicated no statistically significant differences. The results indicate that the PAH data can be pooled and treated as one dataset for further statistical analyses.

TABLE 2
Benzo(*a*)Pyrene Toxic Equivalent Factors (BAP-TEF)

Compound	EPA TEF
Benzo(*a*)pyrene	1.0
Benz(*a*)anthracene	0.1
Benzo(*b*)fluoranthene	0.1
Benzo(*k*)fluoranthene	0.1
Chrysene	0.001
Dibenzo(*a,h*)anthracene	1.0
Indeno(1,2,3-c,d)pyrene	0.1

The results of the PAH analyses are presented in Table 3 for all cities combined. A summary of the PAH results by city and for all cities combined is presented in Table 4, which reports for each: tPAH, total cPAH, and total B(*a*)P-TE. The arithmetic mean and the upper 95% confidence limit concentration are reported for each. Table 4 provides a summary of the data by city, and the results are graphically presented in Figure 1.

Table 5 presents a summary of the metals, TPH, and solids data by city. A Hartley test for homogeneity of variances and a one-factor analysis of variance to test for equality of the means indicated that the metals and TPH data from the three cities cannot be combined. This is due to the fact that the concentrations in each city are not normally distributed and did not have equal variances. The concentrations of the metals are compared to the arithmetic mean concentrations in the eastern U.S. (ATSDR, 1992) in Table 5. Most notably, lead concentrations are much higher than background concentrations. This is most likely due to the effects of automobile exhaust.

In order to determine if sample location significantly affected PAH concentration results, individual samples were classified based on the sample location's

TABLE 3
Summary Statistics for PAH — All Areas Combined

Compound	Minimum detect (mg/kg)	Maximum detect (mg/kg)	Arithmetic mean	Upper 95% interval (mg/kg)	Frequency of detection[a]	
2-Methylnaphthalene	0.017	0.64	0.151	0.173	19	62
Acenaphthene	0.024	0.34	0.201	0.306	30	62
Acenaphthylene	0.018	1.10	0.173	0.208	24	62
Anthracene	0.029	5.70	0.351	0.535	54	62
Benzo(*a*)anthracene	0.048	15.00	1.319	1.858	58	62
Benzo(*a*)pyrene	0.040	13.00	1.323	1.816	57	62
Benzo(*b*)fluoranthene	0.049	12.00	1.435	1.973	55	62
Benzo(*g,h,i*)perylene	0.200	5.90	0.891	1.195	36	62
Benzo(*k*)fluoranthene	0.043	25.00	1.681	2.522	59	62
Chrysene	0.038	21.00	1.841	2.693	60	62
Dibenzo(*a,h*)anthracene	0.020	2.90	0.388	0.521	32	62
Fluoranthene	0.110	39.00	3.047	4.444	60	62
Fluorene	0.022	3.30	0.214	0.317	35	62
Indeno(1,2,3-c,d)pyrene	0.093	6.00	0.987	1.293	43	62
Naphthalene	0.018	0.66	0.125	0.149	35	62
Phenanthrene	0.071	36.00	1.838	2.982	61	62
Pyrene	0.082	11.00	2.398	2.945	61	62
Total BAP-TE	0.257	21.31	2.437	3.324	62	62
Total carcinogenic PAH	0.680	77.70	8.973	12.423	62	62
Total PAH	2.292	166.65	18.361	24.819	62	62

[a] Frequency of detection = number detected: number samples.

TABLE 4
Background PAH Concentrations in Urban Surface Soils[a]

Compound	Boston (n = 20)		Providence (n = 20)		Springfield (n = 20)		All cities (n = 60)	
	Arithmetic mean (ppm)	Upper 95% CI (ppm)	Arithmetic mean (ppm)	Upper 95% CI (ppm)	Arithmetic mean (ppm)	Upper 95% CI (ppm)	Arithmetic mean (ppm)	Upper 95% CI (ppm)
Total B(*a*)P-TE	2.4	4.6	2.1	2.9	2.8	4.5	2.4	3.3
Total cPAH	8.4	16.0	7.8	11.0	10.6	18.3	9.0	12.4
Total PAH	18.7	35.9	16.8	23.5	19.1	29.9	18.4	24.8
TPH	474.9	652.6	267.4	338.2	184.4	233.3	306.2	372.8

[a] 0 to 6 in.

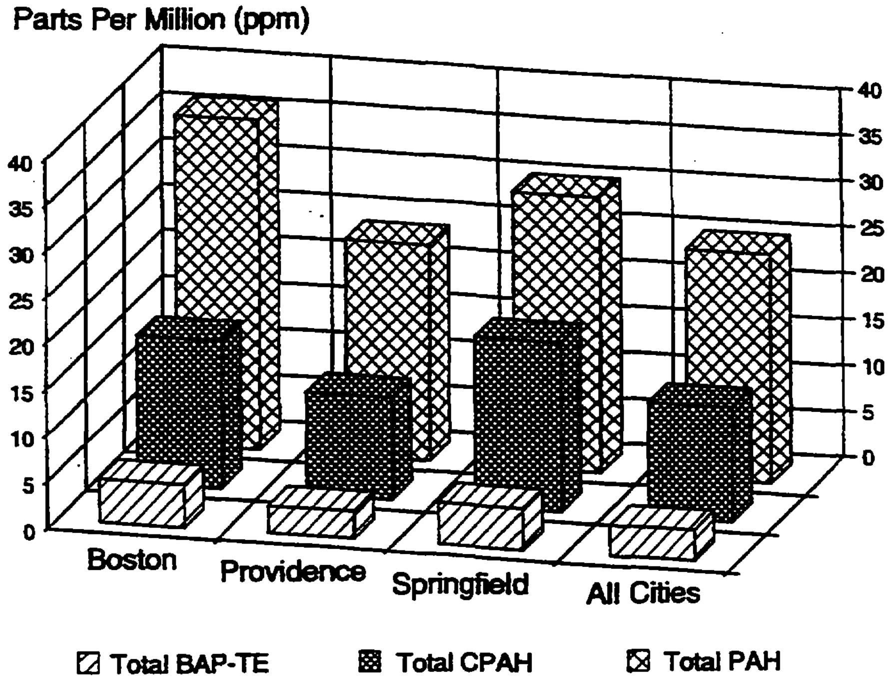

FIGURE 1. Background concentrations of PAH in urban soils. Data presented are the upper 95% confidence interval on the arithmetic mean. Data are presented numerically in Table 4.

proximity to asphalt pavement, based on both written and photographic documentation of sample location. Generally, samples collected within 4 to 6 ft of a road were considered to be near pavement. Of the 60 separate locations, 42 were considered to be near pavement and 18 were not. When tested for equality of variance and means as above, the two populations were determined to be significantly different. The mean total PAH concentration near pavement was 22 ppm compared to 8 ppm not near pavement. These results are shown in Table 6.

Similar analyses were performed to see if TPH or total organic carbon concentrations could be used as surrogates for PAH concentrations. The results showed that there is no correlation between PAH and TPH concentrations, nor between PAH and total organic carbon concentrations (data not shown).

The highest total PAH concentration detected was 166 mg/kg, taken from a street corner in Boston. The next highest PAH concentration was 109 mg/kg, taken at the base of a telephone pole. Four of the 60 samples were taken at the bases of telephone poles, with widely varying results. The total PAH concentrations in the other three locations were 62, 4, and 45 mg/kg.

TABLE 5
Summary Statistics for Metals, TPH, and Soils by City

Compound	Boston (n = 20) Arithmetic mean (mg/kg)	Boston (n = 20) Upper 95% interval (mg/kg)	Providence (n = 20) Arithmetic mean (mg/kg)	Providence (n = 20) Upper 95% interval (mg/kg)	Springfield (n = 20) Arithmetic mean (mg/kg)	Springfield (n = 20) Upper 95% interval (mg/kg)	Arithmetic mean in U.S. soils[a] (mg/kg)
Arsenic, total	4.20	5.59	3.53	4.27	5.63	9.23	7.4
Barium, total	53.95	66.25	45.29	59.43	45.17	51.03	420
Cadmium, total	1.55	2.79	ND	ND	ND	ND	0.25[b]
Chromium, total	23.00	27.69	12.08	14.35	12.62	14.45	52
Lead, total	398.70	737.44	305.76	462.98	261.69	377.76	17
Mercury, total	0.29	0.39	0.19	0.24	0.20	0.25	0.12
Selenium, total	0.51	0.57	0.39	0.48	0.53	0.55	0.45
Total petroleum hydrocarbons	474.90	652.62	267.43	338.19	184.38	233.27	—
Total solids	90%	93%	93%	95%	90%	92%	—

[a] ATSDR. 1992. *Public Health Assessment Guidance Manual*. PB92-147164. U.S. Department of Health and Human Services.
[b] ATSDR. 1991. *Toxicological Profile for Cadmium*. PB92-147164. Draft. U.S. Department of Health and Human Services.

TABLE 6

Comparison of Background PAH Concentrations in Urban Soils: The Effects of Proximity to Pavement

	Near pavement		Not near pavement		Results of statistical analysis: Test for homogeneity of variances			Results of statistical analysis: Test of equality of means		
Compound	Arithmetic mean (ppm)	Standard deviation	Arithmetic mean (ppm)	Standard deviation	Sample F-statistics	Associated degrees of freedom	Statistically significant at 0.05 level of significance	Sample Student's *t*	Associated degrees of freedom	Statistically significant at 0.05 level of significance
Total B(*a*)P-TE	2.9	4.2	1.1	0.92	21.3	41, 17	Yes	2.69	50	Yes
Total PAH	21.9	30.7	8.3	7.2	18.4	41, 17	Yes	2.69	50	Yes

IV. CONCLUSION

In this study, 20 surface soil samples were collected from each of three New England cities and analyzed for PAH, TPH, and metals. The results of the statistical analyses described in the previous section show that, with respect to PAH, the three datasets are not significantly different and can be considered as one dataset representative of urban environments. The samples were taken in typical urban areas but not near known industrial sites. Therefore, these data are considered to be representative of the generalized effects of urban activities.

It is clear from the results presented here that common regulatory target cleanup levels for cPAH and B(*a*)P-TE (0.1 to 0.66 mg/kg) are much below the background concentrations of these compounds in urban surface soils (upper 95% confidence interval of 3.3 and 12.4 mg/kg for total B(*a*)P-TE and total cPAH, respectively). Figure 2 graphically compares the "bright line" target cleanup level for B(*a*)P of 0.1 mg/kg with the total B(*a*)P-TE (upper 95% confidence interval on the arithmetic mean) measured in urban environments.

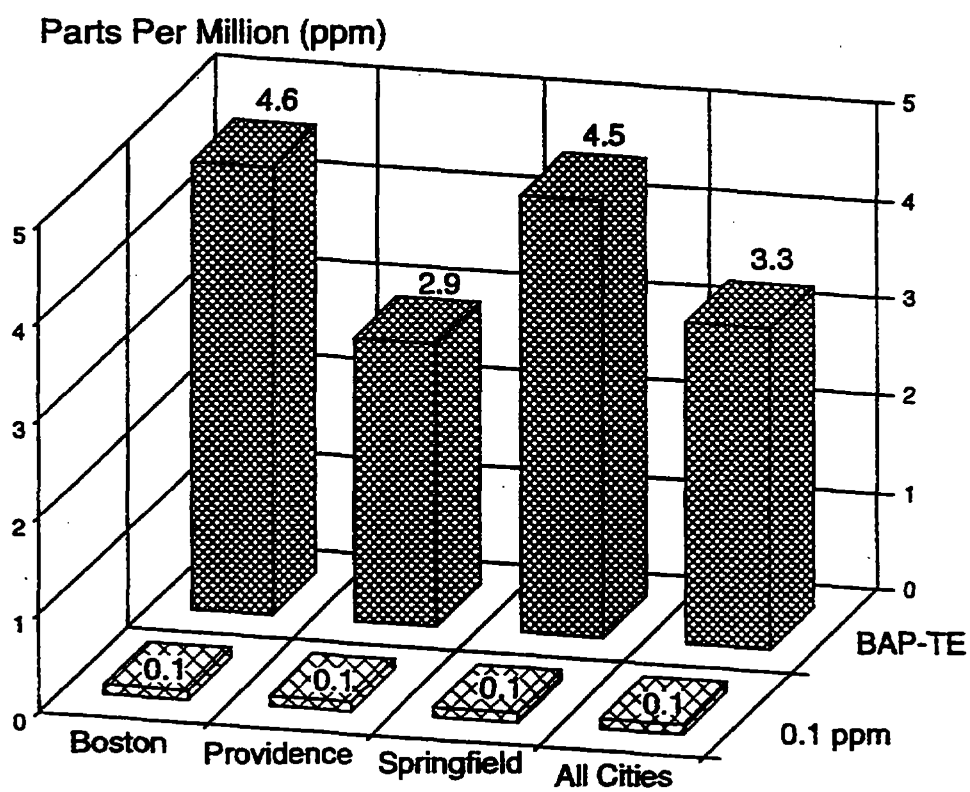

FIGURE 2. Comparison of B(*a*)P-TE with U.S. EPA Region III[4] risk-based concentration for B(*a*)P. B(*a*)P data presented are the upper 95% confidence interval on the arithmetic mean.

Upper 95% confidence intervals are compared because this is the statistic preferred by EPA and many states for risk assessment. Moreover, the State of Massachusetts defines its background concentrations of metals based on the upper 95% confidence limit on the arithmetic mean concentration (Massachusetts Department of Environmental Protection, 1992). For all cities combined, the background level of B(*a*)P-TE of 3.3 mg/kg is approximately ten times greater than the target cleanup level of 0.33 mg/kg and approximately 30 times higher than the target cleanup level of 0.1 mg/kg. For those regulatory situations in which the use of B(*a*)P-TEFs in determining site risk is not allowed, the background level of cPAH is approximately 40 to 100 times greater than these target cleanup levels.

An analysis of the data comparing samples taken near pavement with those determined to be not near pavement indicated that those samples designated near pavement had significantly higher, approximately threefold higher, PAH concentrations for both total PAH and total B(*a*)P-TE. This is most likely due to the presence of diesel and automobile exhaust particles, perhaps influenced by the presence of asphalt and runoff of vehicular oil from the roads.

Total petroleum hydrocarbons (TPH) were also found at consistently high levels in each city. The commonly applied regulatory cleanup level for TPH is 100 mg/kg. This cleanup level is not risk based and is three times lower than the background concentration of TPH found in this study (arithmetic mean of 306 mg/kg and upper 95% confidence interval on the mean of 373 mg/kg).

It is incumbent upon the regulatory agencies to recognize that substantial background levels of PAH and TPH exist in our urban environments and to acknowledge this information in the development of realistic target cleanup levels. The use of these background data in setting more realistic target cleanup levels may result in better allocation of remedial and regulatory dollars in site investigations.

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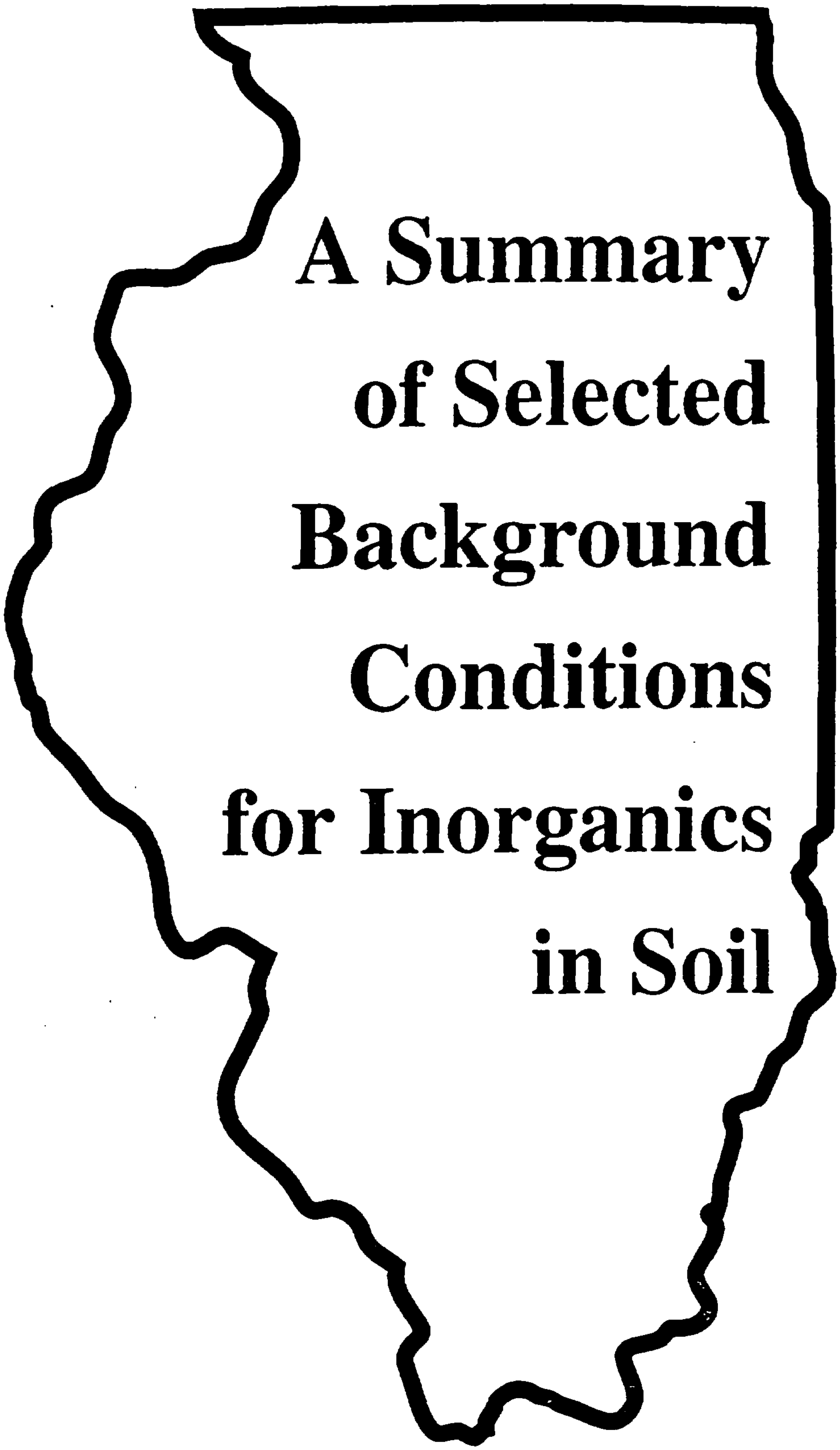

A Summary of Selected Background Conditions for Inorganics in Soil

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TECHNICAL REPORT

A SUMMARY OF SELECTED BACKGROUND CONDITIONS FOR INORGANICS IN SOIL

Office of Chemical Safety
Illinois Environmental Protection Agency
August 1994

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TABLE OF CONTENTS

Introduction

The Office of Chemical Safety has completed a summary of selected background conditions for inorganic chemicals in surface soils in Illinois. The objectives of this project were as follows:

(1) to ascertain a reasonable indication of statewide background concentrations in soil of selected inorganic chemicals of public health and ecological interest;

(2) to support the Agency's efforts in determining the presence of elevated levels of lead in soil by determining the levels of lead present in selected background soils across the state; and

(3) to utilize, to the extent possible, existing site-specific studies and background data which represents a major data resource already existing within Agency files.

Technical Approach

The first step of this project involved the review of existing Agency files in order to obtain data on background concentrations in soil. The results were obtained from samples taken in areas, judged by the field staff taking the samples, to be undisturbed and unimpacted by site-related activities. No efforts were made to investigate these results relative to the potential for past sources of atmospheric deposition (e.g., smelter, leaded gasoline, etc.) or previous site activities at the background sample location. Certain areas of the state have likely been impacted by anthropogenic sources and therefore represent conditions that may vary from naturally occurring levels. Sample results were obtained from Preliminary Assessment/Site Investigations performed since 1986 plus sample results from State and Federal Superfund site investigations in Illinois.

The second step in the process of generating this technical report involved the collection of additional samples. Surface soil samples were obtained by Agency staff from those counties in the State for which data were lacking. These samples were specifically taken from areas expected to represent naturally occurring background.

The current database includes 275 data points from sample locations in all 102 counties in Illinois. Since some of these sites required varying degrees of investigation, certain samples do not include the complete list of analytical parameters. As a result, each inorganic may have a different number of data points. The minimum concentrations, maximum concentrations, mean concentrations, and median concentrations were calculated for each of the inorganic parameters. Values which were reported as less than the detection limit were included in the summary statistics by using one-half of the detection limit. If upon analysis of these data, it could be concluded that the background sample had been impacted by site-related activities then the sample was not used in the summary data.

Data used in this report are laboratory analytical values for total metals determined by USEPA SW-846 methods. These methods convert all of each metal tested to a soluble ion that can be detected. Since the original ionic speciation of the metals are not known, conclusions regarding mobility, exposure, assimilations, and toxicity cannot be directly inferred.

It should be noted that uncertainties inherent in a report of this type include those due to variation in sampling procedures, variation in sampling depth, the use of one-half the detection limit for non-detects, differences in analytical techniques between laboratories, and the impact of anthropogenic sources on the concentrations existing at the sample location. Furthermore, we wish to emphasize that the samples were not collected randomly nor in accordance with an a priori experimental design. Due to resource constraints, the majority of data used pre-existed this study. Consequently, this study is not and should not be characterized as having a totally unbiased scientific basis.

Results

Figure 1 shows the survey locations across the State. Table 1, 2, and 3 include an overall summary of the ranges, means, and medians calculated for the inorganic parameters. This overall data set includes samples from urban and rural locations.

Statewide Data -- Table 1 includes a summary of data obtained for the entire state. It should be noted that the statewide summary statistics should be used in conjunction with Tables 2 and 3. These breakouts of urban vs. rural counties indicate that certain inorganic parameters such as lead, zinc, and cadmium are generally higher in the urban environment.

Urban Data -- Table 2 includes data for counties within metropolitan statistical areas (MSAs) and Table 3 includes data for counties outside MSAs. MSAs are geographic areas consisting of a large population nucleus - a census-defined "urbanized area" - together with adjacent communities that have a high degree of economic and social integration with that nucleus. In MSAs with a population of one million or more, primary metropolitan statistical areas (PMSAs) may be identified. When PMSAs are defined, the MSA of which they are component part is redesignated a consolidated metropolitan statistical area (CMSA). Figure 2 shows the MSAs, PMSAs, and CMSA for Illinois.

The following inorganic constituents were detected in certain locations in the state at levels above the ranges for natural soils from the scientific literature: cadmium, lead, barium, mercury, thallium, and zinc.

Cadmium -- Those locations in the state where there is the greatest diversion from background levels published in the scientific literature for cadmium were in the counties of St. Clair and Lake. In St. Clair County, the levels of cadmium detected were highest in Sauget and Fairmont City where the levels detected were 7.3 mg/kg and 8.2 mg/kg, respectively. In Lake County, the highest level of cadmium was 7.4 mg/kg which was obtained from a background site in Waukegan.

Lead -- The highest levels of total lead identified during the survey were found in the counties of Cook and Lake. Two of the three highest detections for lead were in Chicago where the concentrations reported were 346 mg/kg and 647 mg/kg. The second highest concentration of lead detected was 384 mg/kg and was obtained in the City of Waukegan in Lake County.

Data Utilization

These data can be used by programs in the Agency to evaluate the plausible validity of any site-specific background data collected for various cleanup sites across the state. These data, however, are not meant to replace the collection of site-specific background data for sites.

A second use for these data is as a general screening check for determining the potential presence of inorganic contamination at a site. These data appear to present a reasonable indication of background conditions in Illinois and can be used to compare with site data. Doing so could identify any inorganic contaminants which may be present in concentrations above what could be viewed as the "normal" range.

Figure 1

Sample Locations for Selected Background Samples for Inorganics in Soil

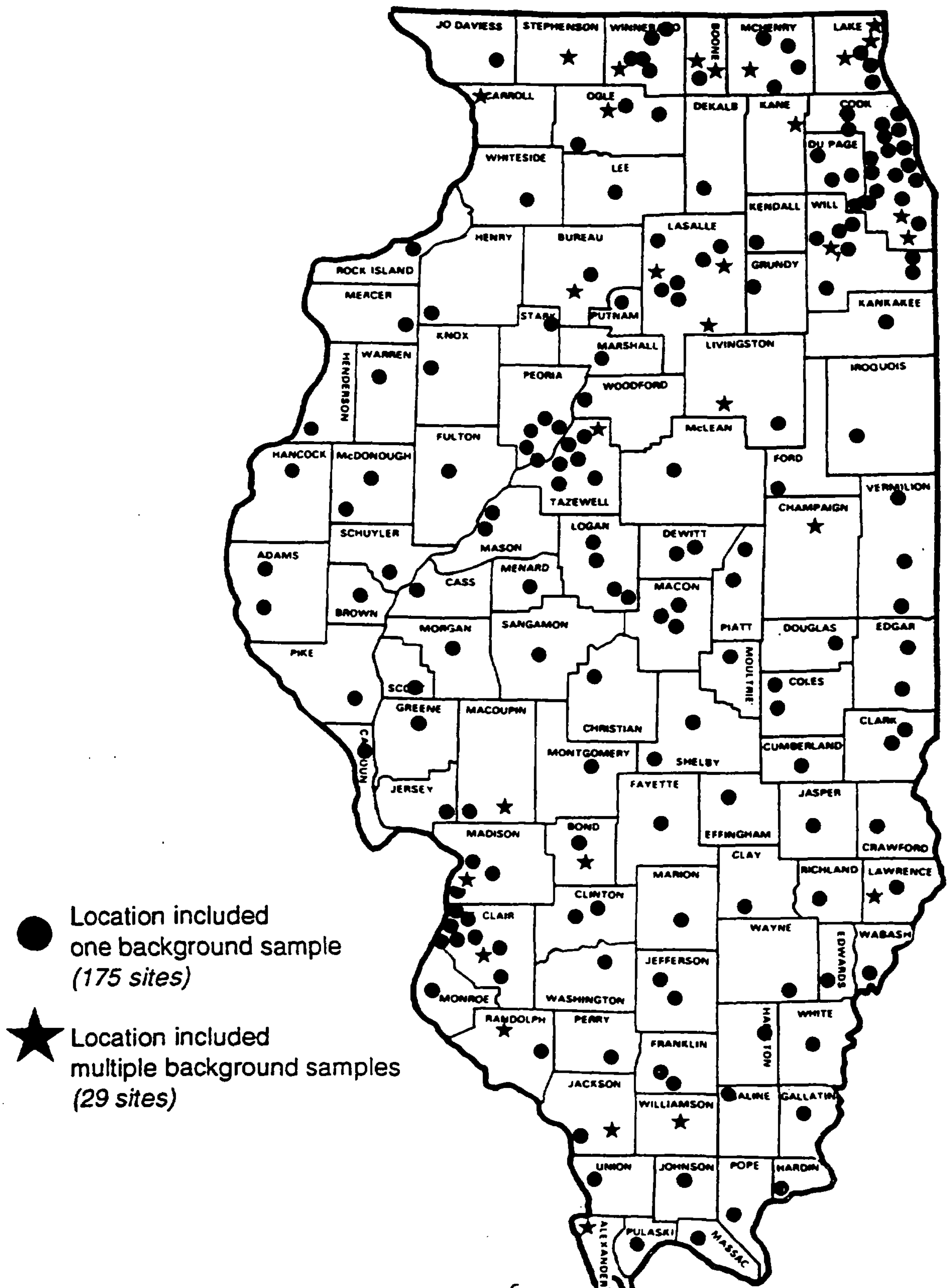
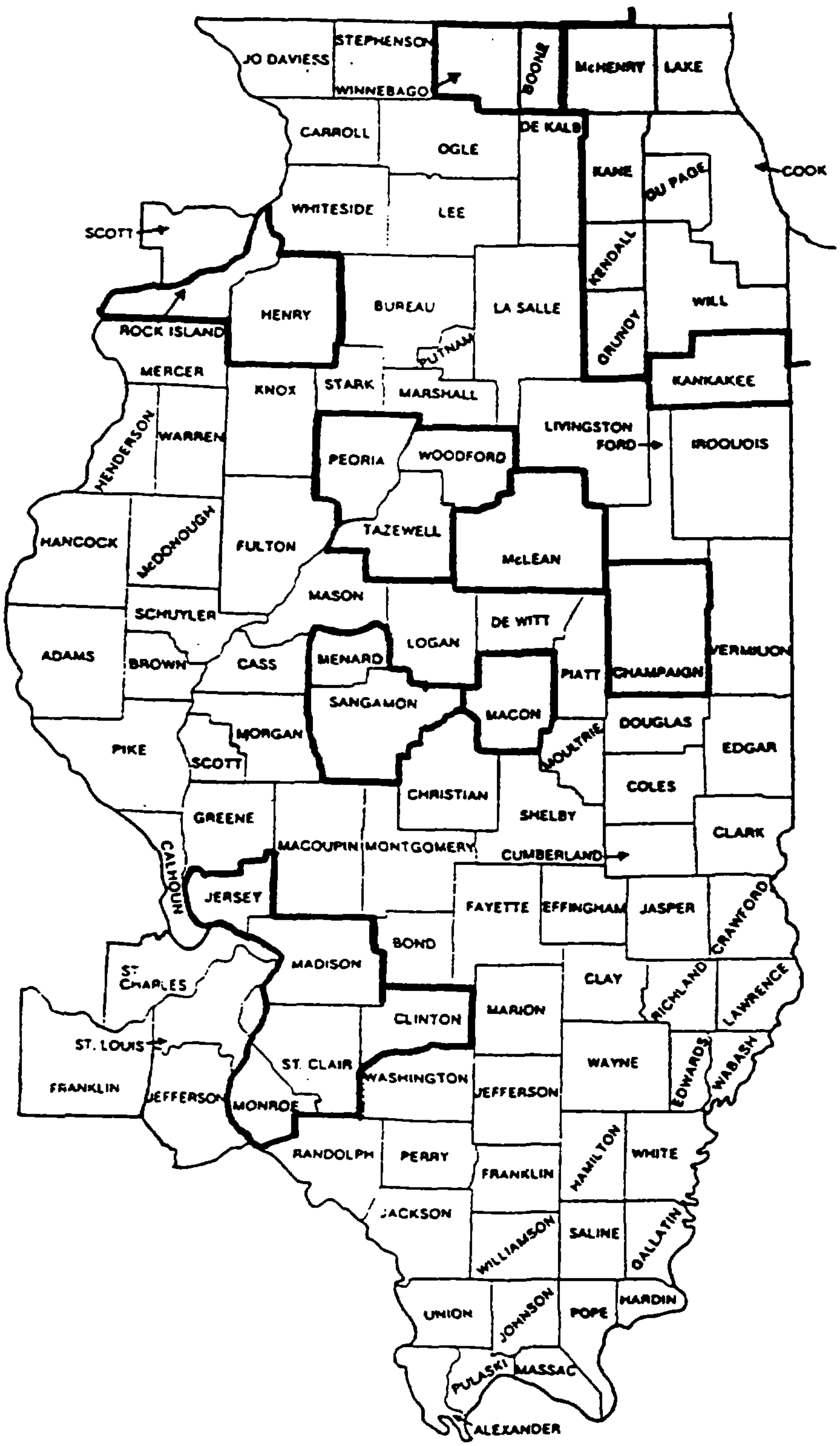


FIGURE 2

Illinois Consolidated Metropolitan Statistical Areas, Primary Metropolitan Statistical Areas, Metropolitan Statistical Areas, and Counties



Aurora-Elgin, IL PMSA
Kane & Kendall Counties, IL
Bloomington-Normal, IL MSA
McLean County, IL
Champaign-Urbana-Rantoul, IL MSA
Champaign County, IL
Chicago, IL PMSA
Cook, DuPage, & McHenry Counties, IL
Chicago-Gary-Lake Cnty, IL-IN-WI CMSA
Aurora-Elgin, IL PMSA
Chicago, IL PMSA
Gary-Hammond, IN PMSA (Lake & Porter Cntys., IN)
Joliet, IL PMSA
Kenosha, WI PMSA (Kenosha Cnty., WI)
Lake County, IL PMSA
Davenport-Rock Island-Moline, IA-IL MSA
Henry & Rock Island Counties, IL (Scott Cnty, IA)
Decatur, IL MSA
Macon County, IL
Joliet, IL PMSA
Grundy & Will Counties, IL
Kankakee, IL MSA
Kankakee County, IL
Lake County, IL PMSA
Lake County, IL
Peoria, IL MSA
Peoria, Tazewell, & Woodford Counties, IL
Rockford, IL MSA
Boone & Winnebago Counties, IL
St. Louis, MO-IL MSA
Clinton, Jersey, Madison, Monroe, & St. Clair Counties, IL
Franklin, Jefferson, St. Charles, & St. Louis Cntys., MO;
St. Louis City, MO)
Springfield, IL MSA
Menard & Sangamon Counties, IL

Source: Illinois Statistical Abstract. 1991.

TABLE 2.

Summary Information for Total Concentrations of
Inorganic Chemicals in Background Soils in Illinois (mg/kg)

Counties **WITHIN** Metropolitan Statistical Areas

Parameter	Number of Data Points	Range	Mean	Median
Aluminum	103	1388 - 37200	10148	9500
Antimony	67	0.24 - 8	4.2	4.0
Arsenic	114	1.1 - 24	7.4	7.2
Barium	109	ND (<5) - 1720	133	110
Beryllium	99	0.05 - 9.9	0.73	0.59
Cadmium	104	ND (<2.5) - 8.2	1.3	0.6
Calcium	103	813 - 130000	20783	9300
Chromium	114	ND (<2.14) - 151	21.2	16.2
Cobalt	103	2.1 - 23	8.8	8.9
Copper	107	ND (<2.93) - 156	28.9	19.6
Cyanide	81	ND (<0.07) - 2.7	0.64	0.51
Iron	105	5000 - 80000	17607	15900
Lead	119	4.7 - 647	71.1	36.0
Magnesium	103	541 - 74500	10872	4820

TABLE 2. - CONTINUED

Parameter	Number of Data Points	Range	Mean	Median
Manganese	105	155 - 5590	742	636
Mercury	87	0.02 - 0.99	0.12	0.06
Nickel	105	ND (<3.1) - 135	20.9	18.0
Potassium	105	270 - 5820	1560	1268
Selenium	85	ND (<0.12) - 2.6	0.58	0.48
Silver	91	ND (<0.32) - 5.6	0.97	0.55
Sodium	97	20.2 - 1290	208	130
Sulfate	15	17.6 - 240	85.8	85.5
Sulfide	11	ND (<1.00) - 10.1	3.9	3.1
Thallium	78	0.02 - 1.6	0.46	0.32
Vanadium	103	ND (<2.5) - 80	25.0	25.2
Zinc	106	23 - 798	137.9	95.0

TABLE 3.

Summary Information for Total Concentrations of
Inorganic Chemicals in Background Soils in Illinois (mg/kg)

Counties **OUTSIDE** Metropolitan Statistical Areas

Parameter	Number of Data Points	Range	Mean	Median
Aluminum	110	2640 - 23300	10105	9200
Antimony	75	0.18 - 8.6	3.2	3.3
Arsenic	120	0.35 - 22.4	5.9	5.2
Barium	142	22.4 - 253	127	122
Beryllium	114	ND (<0.02) - 8.8	0.65	0.56
Cadmium	139	ND (<0.2) - 5.2	0.73	0.50
Calcium	110	630 - 184000	12379	5525
Chromium	147	4.3 - 37	14.3	13.0
Cobalt	111	0.9 - 32	8.9	8.4
Copper	147	1 - 42	13.0	12.0
Cyanide	77	ND (<0.06) - 1.2	0.46	0.50
Iron	141	3200 - 29100	15134	15000
Lead	148	ND (<7.44) - 270	31.5	20.9
Magnesium	111	476 - 24100	3853	2700

TABLE 3. - CONTINUED

Parameter	Number of Data Points	Range	Mean	Median
Manganese	139	61.5 - 3710	784	630
Mercury	113	ND (<0.01) - 1.67	0.10	0.05
Nickel	147	ND (<5) - 34.6	13.9	13.0
Potassium	135	280 - 5600	1210	1100
Selenium	115	ND (<0.1) - 1.7	0.44	0.37
Silver	142	ND (<0.06) - 5.9	0.76	0.50
Sodium	108	14.1 - 7600	222.8	130.0
Sulfate	13	10 - 260	103	110
Sulfide	7	ND (<1) - 8.8	3.4	2.9
Thallium	105	0.05 - 2.8	0.50	0.42
Vanadium	111	6 - 47	25.0	25.0
Zinc	140	ND (<5.5) - 400	76.3	60.2

APPENDIX E

COPC SELECTION FOR SOILS AND SEDIMENT FOR RESIDENTIAL SCENARIOS

APPENDIX E
COPC SELECTION FOR SOILS AND SEDIMENT FOR RESIDENTIAL SCENARIOS

This appendix presents the screening tables for identifying COPCs for areas evaluated under a residential scenario. COPCs for surface soil for each transect, for Fill Area N, and for sediment for the combined CS-F and Borrow Pit Lake (BPL) area are identified using the "Residential Soil – Direct Contact Screening Values" presented in Appendix C Table C-1. The screening tables present:

- The frequency of detection and the arithmetic mean and maximum detected concentrations as presented in Appendix B;
- An identification of essential nutrient status and comparison to background, as presented in Appendix D;
- Comparison to the TACO Tier 1 Residential Soil – Direct Contact screening values; and
- An identification of whether or not a constituent is selected as a COPC and the reason why or why not.

The information in the last column of each table pertains to the short-term risk assessment, and will be discussed in Section 7.0 of the text.

The screening tables are presented in the following order:

- Sediment – CS-F and BPL
- Surface soil – Transect 1
- Surface soil – Transect 2
- Surface soil – Transect 3
- Surface soil – Transect 4
- Surface soil – Transect 5
- Surface soil – Transect 6
- Surface soil – Transect 7
- Surface soil – Fill Area N

The screening results for soils are summarized in Section 3.3.1 of the text, and the screening results for sediments are summarized in Section 3.3.3 of the text.

Sediment - Creek Segment F and BPL

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Sediment Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Residential Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD-TEQ	ug/kg	6	100%	1.19E-01	3.32E-01	No	1 24E-02	Yes	No	1.00E+00	No	No	<Tier I	No
2,4-D	ug/kg	6	50%	1.37E+01	2.30E+01	No	2 03E+01	Yes	No	7 80E+05	No	No	<Tier I	No
4,4'-DDD	ug/kg	6	17%	3.80E+00	3.80E+00	No	ND	--	No	3.00E+03	No	No	<Tier I	No
4,4'-DDE	ug/kg	6	100%	4.58E+00	1.10E+01	No	ND	--	No	2.00E+03	No	No	<Tier I	No
4,4'-DDT	ug/kg	6	50%	2.35E+00	4.50E+00	No	ND	--	No	2.00E+03	No	No	<Tier I	No
Aldrin	ug/kg	6	17%	3.81E+00	4.10E+00	No	ND	--	No	4.00E+01	No	No	<Tier I	No
Alpha Chlordane	ug/kg	6	100%	2.60E+00	5.30E+00	No	ND	--	No	5.00E+02	No	No	<Tier I	No
Aluminum	mg/kg	6	100%	1.33E+04	1.70E+04	No	2.90E+04	No	Yes	7.60E+04	No	No	<Tier I	No
Antimony	mg/kg	5	80%	2.21E+00	2.60E+00	No	2.75E+00	No	Yes	3.10E+01	No	No	<Tier I	No
Arsenic	mg/kg	6	100%	1.48E+01	1.90E+01	No	1.44E+01	Yes	No	4.00E-01	Yes	Yes	>Tier I	No
Barium	mg/kg	6	100%	2 86E+02	4 20E+02	No	4.13E+02	Yes	No	5 50E+03	No	No	<Tier I	No
Beryllium	mg/kg	6	100%	7.35E-01	8.90E-01	No	1.56E+00	No	Yes	1 56E+02	No	No	<Tier I	No
Cadmium	mg/kg	6	100%	1.24E+01	4.70E+01	No	8.30E-01	Yes	No	7.80E+01	No	No	<Tier I	No
Calcium	mg/kg	6	100%	1.31E+04	1.65E+04	Yes	2 70E+04	No	Yes	NA	No	No	EN	--
Chromium	mg/kg	6	100%	2.53E+01	3.80E+01	No	4.00E+01	No	Yes	2.70E+02	No	No	<Tier I	No
Chrysene	ug/kg	6	17%	7.40E+01	7.40E+01	No	ND	--	No	8.80E+04	No	No	<Tier I	No
Cobalt	mg/kg	6	100%	9.38E+00	1.30E+01	No	1.72E+01	No	Yes	4.70E+03	No	No	<Tier I	No
Copper	mg/kg	6	100%	1.59E+02	4.10E+02	No	3.80E+01	Yes	No	2.90E+03	No	No	<Tier I	No
delta-BHC	ug/kg	6	17%	3.40E-01	3.40E-01	No	ND	--	No	1.00E+02	No	No	<Tier I	No
Dieldrin	ug/kg	6	67%	4.01E+00	9.30E+00	No	ND	--	No	4.00E+01	No	No	<Tier I	No
Endosulfan I	ug/kg	6	100%	2 54E+00	5.70E+00	No	ND	--	No	4 70E+05	No	No	<Tier I	No
Endosulfan II	ug/kg	6	50%	5.54E+00	8.10E+00	No	ND	--	No	4.70E+05	No	No	<Tier I	No
Endosulfan sulfate	ug/kg	6	50%	3.06E+00	4.97E+00	No	ND	--	No	4.70E+05	No	No	<Tier I	No
Endrin	ug/kg	6	33%	1 70E+00	1.70E+00	No	ND	--	No	2 30E+04	No	No	<Tier I	No
Endrin aldehyde	ug/kg	6	100%	5 23E+00	1 40E+01	No	ND	--	No	2.30E+04	No	No	<Tier I	No
Endrin ketone	ug/kg	6	67%	6.70E+00	1.00E+01	No	ND	--	No	2.30E+04	No	No	<Tier I	No
Ethylbenzene	ug/kg	6	17%	9.75E+00	1.10E+01	No	ND	--	No	4.00E+05	No	No	<Tier I	No
Fluoranthene	ug/kg	6	33%	1 25E+02	1.30E+02	No	ND	--	No	3.10E+06	No	No	<Tier I	No
Gamma Chlordane	ug/kg	6	83%	5 89E+00	1.70E+01	No	ND	--	No	5.00E+02	No	No	<Tier I	No
gamma-BHC (Lindane)	ug/kg	6	17%	2.43E+00	2.43E+00	No	ND	--	No	5.00E+02	No	No	<Tier I	No
Heptachlor	ug/kg	6	17%	9 30E-01	9 30E-01	No	ND	--	No	1.00E+02	No	No	<Tier I	No
Heptachlor epoxide	ug/kg	6	50%	3.60E+00	5.40E+00	No	ND	--	No	7.00E+01	No	No	<Tier I	No
Iron	mg/kg	6	100%	2.73E+04	3 80E+04	Yes	4.13E+04	No	Yes	NA	No	No	EN	--
Lead	mg/kg	6	100%	1.14E+02	3 20E+02	No	4 38E+01	Yes	No	4.00E+02	No	No	<Tier I	No
Magnesium	mg/kg	6	100%	5.03E+03	6.80E+03	Yes	1.03E+04	No	Yes	NA	No	No	EN	--
Manganese	mg/kg	6	100%	7.50E+02	1.40E+03	No	1 42E+03	No	Yes	3.70E+03	No	No	<Tier I	No
Mercury	mg/kg	6	100%	3.70E-01	1.10E+00	No	9 60E-02	Yes	No	1.00E+01	No	No	<Tier I	No
Methoxychlor	ug/kg	6	50%	1.51E+01	2 40E+01	No	ND	--	No	3 90E+05	No	No	<Tier I	No
Molybdenum	mg/kg	6	100%	1.16E+00	3.70E+00	No	8 90E-01	Yes	No	3 90E+02	No	No	<Tier I	No
Nickel	mg/kg	6	100%	1.34E+02	3.90E+02	No	4.28E+01	Yes	No	1.60E+03	No	No	<Tier I	No
Potassium	mg/kg	6	100%	2.18E+03	2.90E+03	Yes	4.20E+03	No	Yes	NA	No	No	EN	--
Silver	mg/kg	6	17%	7.90E-01	7.90E-01	No	ND	--	No	3 90E+02	No	No	<Tier I	No
Total PCBs	ug/kg	43	47%	4.02E+02	6.29E+03	No	ND	--	No	1.00E+03	Yes	Yes	>Tier I	No
Vanadium	mg/kg	6	100%	3.69E+01	5 10E+01	No	6.98E+01	No	Yes	5 50E+02	No	No	<Tier I	No
Zinc	mg/kg	6	100%	1 20E+03	3 70E+03	No	1 66E+02	Yes	No	2 30E+04	No	No	<Tier I	No

Surface Soil - Residential TACO Screen
Transect 1

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Residential Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD-TEQ	ug/kg	5	100%	6.16E-03	1.31E-02	No	1.24E-01	No	Yes	1.00E+00	No	No	<DC	No
2,4-D	ug/kg	10	10%	3.60E+00	3.60E+00	No	ND	--	No	7.80E+05	No	No	<DC	No
2-Butanone (MEK)	ug/kg	10	20%	1.81E+01	3.20E+01	No	ND	--	No	7.30E+06	No	No	<DC	No
2-Hexanone	ug/kg	10	10%	6.60E+00	6.60E+00	No	3.30E+01	No	Yes	7.90E+05	No	No	<DC	No
4,4'-DDE	ug/kg	10	70%	3.04E-01	5.65E-01	No	1.61E+01	No	Yes	2.00E+03	No	No	<DC	No
4,4'-DDT	ug/kg	10	50%	4.81E-01	9.33E-01	No	1.41E+01	No	Yes	2.00E+03	No	No	<DC	No
Acetone	ug/kg	10	50%	1.79E+02	4.40E+02	No	ND	--	No	7.80E+06	No	No	<DC	No
Aluminum	mg/kg	10	100%	9.89E+03	1.50E+04	No	2.54E+04	No	Yes	7.60E+04	No	No	<DC	No
Antimony	mg/kg	10	80%	1.84E+00	2.60E+00	No	3.80E+00	No	Yes	3.10E+01	No	No	<DC	No
Arsenic	mg/kg	10	100%	8.10E+00	1.00E+01	No	1.91E+01	No	Yes	4.00E-01	Yes	No	<BK	No
Barium	mg/kg	10	100%	1.83E+02	2.40E+02	No	3.63E+02	No	Yes	5.50E+03	No	No	<DC	No
Benzene	ug/kg	10	10%	2.83E+00	3.00E+00	No	ND	--	No	8.00E+02	No	No	<DC	No
Beryllium	mg/kg	10	100%	6.30E-01	9.40E-01	No	1.51E+00	No	Yes	1.56E+02	No	No	<DC	No
bis(2-Ethylhexyl)phthalate	ug/kg	10	10%	1.05E+02	1.60E+02	No	3.22E+02	No	Yes	4.60E+04	No	No	<DC	No
Cadmium	mg/kg	10	100%	2.74E+00	4.80E+00	No	8.65E+00	No	Yes	7.80E+01	No	No	<DC	No
Calcium	mg/kg	10	100%	5.91E+03	8.70E+03	Yes	3.35E+04	No	Yes	NA	No	No	EN	--
Carbon disulfide	ug/kg	10	10%	2.50E+00	2.60E+00	No	ND	--	No	7.20E+05	No	No	<DC	No
Chlorobenzene	ugkg	10	10%	3.03E+00	4.00E+00	No	ND	--	No	1.30E+05	No	No	<DC	No
Chromium	mg/kg	10	100%	1.89E+01	4.90E+01	No	3.93E+01	Yes	No	2.70E+02	No	No	<DC	No
Cobalt	mg/kg	10	100%	7.01E+00	9.20E+00	No	1.55E+01	No	Yes	4.70E+03	No	No	<DC	No
Copper	mg/kg	10	100%	1.32E+02	2.30E+02	No	2.09E+02	Yes	No	2.90E+03	No	No	<DC	No
Dicamba	ug/kg	10	40%	3.06E+00	6.35E+00	No	ND	--	No	1.80E+06	No	No	<DC	No
Dieldrin	ug/kg	10	30%	5.76E-01	1.50E+00	No	ND	--	No	4.00E+01	No	No	<DC	No
Endosulfan sulfate	ug/kg	10	40%	2.61E-01	4.50E-01	No	ND	--	No	4.70E+05	No	No	<DC	No
Endrin ketone	ug/kg	10	70%	2.66E-01	4.90E-01	No	ND	--	No	2.30E+04	No	No	<DC	No
Fluoranthene	ug/kg	10	10%	6.60E+01	6.60E+01	No	5.02E+02	No	Yes	3.10E+06	No	No	<DC	No
Heptachlor epoxide	ug/kg	10	60%	2.60E-01	5.07E-01	No	ND	--	No	7.00E+01	No	No	<DC	No
Iron	mg/kg	10	100%	1.60E+04	2.20E+04	Yes	3.80E+04	No	Yes	NA	No	No	EN	--
Lead	mg/kg	10	100%	7.29E+01	1.20E+02	No	1.85E+02	No	Yes	4.00E+02	No	No	<DC	No
Magnesium	mg/kg	10	100%	4.40E+03	5.30E+03	Yes	1.72E+04	No	Yes	NA	No	No	EN	--
Manganese	mg/kg	10	100%	3.65E+02	5.50E+02	No	8.83E+02	No	Yes	3.70E+03	No	No	<DC	No
MCPA	ug/kg	10	40%	2.71E+03	7.40E+03	No	1.45E+04	No	Yes	3.10E+04	No	No	<DC	No
Mercury	mg/kg	10	100%	6.25E-02	9.90E-02	No	1.77E-01	No	Yes	1.00E+01	No	No	<DC	No
Methoxychlor	ug/kg	10	50%	2.06E+00	2.90E+00	No	ND	--	No	3.90E+05	No	No	<DC	No
Methylene chloride	ug/kg	10	20%	2.20E+00	2.40E+00	No	1.14E+01	No	Yes	1.30E+04	No	No	<DC	No
Molybdenum	mg/kg	10	100%	5.03E-01	8.60E-01	No	2.02E+00	No	Yes	3.90E+02	No	No	<DC	No
Nickel	mg/kg	10	100%	1.95E+01	2.50E+01	No	4.27E+01	No	Yes	1.60E+03	No	No	<DC	No
Pentachlorophenol	ug/kg	10	90%	2.96E+02	4.82E+02	No	See notes	--	No	3.00E+03	No	No	<DC	No
Potassium	mg/kg	10	100%	2.00E+03	2.80E+03	Yes	4.73E+03	No	Yes	NA	No	No	EN	--
Selenium	mg/kg	10	20%	6.18E-01	8.10E-01	No	ND	--	No	3.90E+02	No	No	<DC	No
Silver	mg/kg	10	90%	3.94E-01	5.90E-01	No	1.35E+00	No	Yes	3.90E+02	No	No	<DC	No
Thallium	mg/kg	10	40%	6.84E-01	9.80E-01	No	ND	--	No	6.30E+00	No	No	<DC	No
Toluene	ug/kg	10	20%	2.84E+00	3.20E+00	No	ND	--	No	6.50E+05	No	No	<DC	No

Surface Soil - Residential TACO Screen
Transect 1

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Residential Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total PCBs	ug/kg	10	100%	1.01E+02	2.31E+02	No	See notes	--	No	1.00E+03	No	No	<DC	No
Trichloroethene	ug/kg	10	30%	3.52E+00	6.20E+00	No	ND	--	No	5.00E+03	No	No	<DC	No
Vanadium	mg/kg	10	100%	2.84E+01	4.10E+01	No	6.90E+01	No	Yes	5.50E+02	No	No	<DC	No
Zinc	mg/kg	10	100%	3.88E+02	1.40E+03	No	8.08E+02	Yes	No	2.30E+04	No	No	<DC	No

E-5

Surface Soil - Residential TACO Screen
Transect 2

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Residential Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD-TEQ	ug/kg	4	100%	5.87E-03	9.94E-03	No	1.24E-01	No	Yes	1.00E+00	No	No	<DC	No
2-Butanone (MEK)	ug/kg	9	67%	2.19E+01	3.40E+01	No	ND	--	No	7.30E+06	No	No	<DC	No
2-Hexanone	ug/kg	9	11%	4.80E+00	4.80E+00	No	3.30E+01	No	Yes	7.90E+05	No	No	<DC	No
4,4'-DDD	ug/kg	9	11%	5.60E-01	5.60E-01	No	ND	--	No	3.00E+03	No	No	<DC	No
4,4'-DDE	ug/kg	9	33%	3.80E-01	4.80E-01	No	1.61E+01	No	Yes	2.00E+03	No	No	<DC	No
4,4'-DDT	ug/kg	9	56%	2.62E+00	1.40E+01	No	1.41E+01	No	Yes	2.00E+03	No	No	<DC	No
Acetone	ug/kg	9	67%	2.17E+02	4.50E+02	No	ND	--	No	7.80E+06	No	No	<DC	No
Aluminum	mg/kg	9	100%	1.21E+04	1.80E+04	No	2.54E+04	No	Yes	7.60E+04	No	No	<DC	No
Antimony	mg/kg	9	67%	1.21E+00	1.70E+00	No	3.80E+00	No	Yes	3.10E+01	No	No	<DC	No
Arsenic	mg/kg	9	100%	7.94E+00	1.00E+01	No	1.91E+01	No	Yes	4.00E-01	Yes	No	<BK	No
Barium	mg/kg	9	100%	1.92E+02	2.30E+02	No	3.63E+02	No	Yes	5.50E+03	No	No	<DC	No
Benzo(a)anthracene	ug/kg	9	22%	5.90E+01	7.20E+01	No	2.40E+02	No	Yes	9.00E+02	No	No	<DC	No
Benzo(a)pyrene	ug/kg	9	22%	5.64E+01	7.20E+01	No	1.87E+02	No	Yes	9.00E+01	No	No	<DC	No
Benzo(b)fluoranthene	ug/kg	9	33%	4.87E+01	7.20E+01	No	1.79E+02	No	Yes	9.00E+02	No	No	<DC	No
Benzo(g,h,i)perylene	ug/kg	9	11%	4.00E+01	4.00E+01	No	1.27E+02	No	Yes	2.30E+06	No	No	<DC	No
Benzo(k)fluoranthene	ug/kg	9	22%	5.80E+01	6.30E+01	No	2.08E+02	No	Yes	9.00E+03	No	No	<DC	No
Beryllium	mg/kg	9	78%	6.82E-01	1.10E+00	No	1.51E+00	No	Yes	1.56E+02	No	No	<DC	No
bis(2-Ethylhexyl)phthalate	ug/kg	9	33%	7.07E+01	9.40E+01	No	3.22E+02	No	Yes	4.60E+04	No	No	<DC	No
Cadmium	mg/kg	9	100%	2.28E+00	2.80E+00	No	8.65E+00	No	Yes	7.80E+01	No	No	<DC	No
Calcium	mg/kg	9	100%	8.18E+03	1.60E+04	Yes	3.35E+04	No	Yes	NA	No	No	EN	--
Chromium	mg/kg	9	100%	2.13E+01	4.80E+01	No	3.93E+01	Yes	No	2.70E+02	No	No	<DC	No
Chrysene	ug/kg	9	33%	6.23E+01	8.90E+01	No	2.73E+02	No	Yes	8.80E+04	No	No	<DC	No
Cobalt	mg/kg	9	100%	7.76E+00	1.10E+01	No	1.55E+01	No	Yes	4.70E+03	No	No	<DC	No
Copper	mg/kg	9	100%	9.02E+01	1.40E+02	No	2.09E+02	No	Yes	2.90E+03	No	No	<DC	No
Dicamba	ug/kg	9	22%	2.20E+00	3.10E+00	No	ND	--	No	1.80E+06	No	No	<DC	No
Dieldrin	ug/kg	9	11%	1.30E+00	1.30E+00	No	ND	--	No	4.00E+01	No	No	<DC	No
Di-n-butylphthalate	ug/kg	9	11%	1.03E+02	1.20E+02	No	3.12E+02	No	Yes	2.30E+06	No	No	<DC	No
Endosulfan sulfate	ug/kg	9	33%	3.30E-01	4.70E-01	No	ND	--	No	4.70E+05	No	No	<DC	No
Endrin ketone	ug/kg	9	44%	5.95E-01	1.30E+00	No	ND	--	No	2.30E+04	No	No	<DC	No
Fluoranthene	ug/kg	9	22%	1.08E+02	1.50E+02	No	5.02E+02	No	Yes	3.10E+06	No	No	<DC	No
Gamma Chlordane	ug/kg	9	11%	2.00E-01	2.00E-01	No	ND	--	No	5.00E+02	No	No	<DC	No
Heptachlor epoxide	ug/kg	9	22%	1.70E-01	1.90E-01	No	ND	--	No	7.00E+01	No	No	<DC	No
Iron	mg/kg	9	100%	1.90E+04	2.50E+04	Yes	3.80E+04	No	Yes	NA	No	No	EN	--
Lead	mg/kg	9	100%	6.47E+01	8.80E+01	No	1.85E+02	No	Yes	4.00E+02	No	No	<DC	No
Magnesium	mg/kg	9	100%	5.16E+03	9.50E+03	Yes	1.72E+04	No	Yes	NA	No	No	EN	--
Manganese	mg/kg	9	100%	5.56E+02	1.20E+03	No	8.83E+02	Yes	No	3.70E+03	No	No	<DC	No
MCPA	ug/kg	9	22%	1.75E+03	5.50E+03	No	1.45E+04	No	Yes	3.10E+04	No	No	<DC	No
MCPP	ug/kg	9	11%	1.91E+03	7.60E+03	No	9.97E+03	No	Yes	6.10E+04	No	No	<DC	No
Mercury	mg/kg	9	100%	6.91E-02	9.40E-02	No	1.77E-01	No	Yes	1.00E+01	No	No	<DC	No
Methoxychlor	ug/kg	9	22%	4.30E+00	7.30E+00	No	ND	--	No	3.90E+05	No	No	<DC	No
Methylene chloride	ug/kg	9	11%	2.00E+00	2.00E+00	No	1.14E+01	No	Yes	1.30E+04	No	No	<DC	No

Surface Soil - Residential TACO Screen
Transect 2

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Residential Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Molybdenum	mg/kg	9	100%	7.67E-01	1.30E+00	No	2.02E+00	No	Yes	3.90E+02	No	No	<DC	No
Nickel	mg/kg	9	100%	2.18E+01	2.70E+01	No	4.27E+01	No	Yes	1.60E+03	No	No	<DC	No
Pentachlorophenol	ug/kg	9	44%	2.45E+02	2.51E+02	No	See notes	--	No	3.00E+03	No	No	<DC	No
Phenanthrene	ug/kg	9	22%	5.65E+01	6.10E+01	No	3.35E+02	No	Yes	2.30E+07	No	No	<DC	No
Potassium	mg/kg	9	100%	2.53E+03	3.80E+03	Yes	4.73E+03	No	Yes	NA	No	No	EN	--
Pyrene	ug/kg	9	22%	1.03E+02	1.20E+02	No	4.35E+02	No	Yes	2.30E+06	No	No	<DC	No
Selenium	mg/kg	9	33%	6.01E-01	1.00E+00	No	ND	--	No	3.90E+02	No	No	<DC	No
Silver	mg/kg	9	89%	3.44E-01	4.80E-01	No	1.35E+00	No	Yes	3.90E+02	No	No	<DC	No
Thallium	mg/kg	9	44%	7.21E-01	1.30E+00	No	ND	--	No	6.30E+00	No	No	<DC	No
Toluene	ug/kg	9	11%	3.02E+00	3.40E+00	No	ND	--	No	6.50E+05	No	No	<DC	No
Total PCBs	ug/kg	9	89%	6.68E+01	1.64E+02	No	See notes	--	No	1.00E+03	No	No	<DC	No
Vanadium	mg/kg	9	100%	4.22E+01	1.20E+02	No	6.90E+01	Yes	No	5.50E+02	No	No	<DC	No
Zinc	mg/kg	9	100%	2.46E+02	3.10E+02	No	8.08E+02	No	Yes	2.30E+04	No	No	<DC	No

Surface Soil - Residential TACO Screen
Transect 3

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Residential Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD-TEQ	ug/kg	4	100%	3.07E-03	3.66E-03	No	1.24E-01	No	Yes	1.00E+00	No	No	<DC	No
2,4-DB	ug/kg	10	10%	8.89E+00	4.10E+01	No	ND	--	No	4.90E+05	No	No	<DC	No
2-Butanone (MEK)	ug/kg	10	60%	2.77E+01	4.70E+01	No	ND	--	No	7.30E+06	No	No	<DC	No
2-Hexanone	ug/kg	10	10%	6.90E+00	6.90E+00	No	3.30E+01	No	Yes	7.90E+05	No	No	<DC	No
4,4'-DDE	ug/kg	10	50%	6.22E-01	1.70E+00	No	1.61E+01	No	Yes	2.00E+03	No	No	<DC	No
4,4'-DDT	ug/kg	10	40%	1.21E+00	1.80E+00	No	1.41E+01	No	Yes	2.00E+03	No	No	<DC	No
Acetone	ug/kg	10	60%	3.08E+02	6.70E+02	No	ND	--	No	7.80E+06	No	No	<DC	No
Alpha Chlordane	ug/kg	10	20%	1.48E+00	5.80E+00	No	ND	--	No	5.00E+02	No	No	<DC	No
Aluminum	mg/kg	10	100%	9.46E+03	1.70E+04	No	2.54E+04	No	Yes	7.60E+04	No	No	<DC	No
Anthracene	ug/kg	10	20%	3.85E+01	5.10E+01	No	1.60E+02	No	Yes	2.30E+07	No	No	<DC	No
Antimony	mg/kg	10	40%	1.20E+00	1.90E+00	No	3.80E+00	No	Yes	3.10E+01	No	No	<DC	No
Arsenic	mg/kg	10	100%	6.64E+00	9.70E+00	No	1.91E+01	No	Yes	4.00E-01	Yes	No	<BK	No
Barium	mg/kg	10	100%	1.65E+02	2.20E+02	No	3.63E+02	No	Yes	5.50E+03	No	No	<DC	No
Benzene	ug/kg	10	10%	2.10E+00	2.10E+00	No	ND	--	No	8.00E+02	No	No	<DC	No
Benzo(a)anthracene	ug/kg	10	50%	1.20E+02	4.80E+02	No	2.40E+02	Yes	No	9.00E+02	No	No	<DC	No
Benzo(a)pyrene	ug/kg	10	40%	1.37E+02	8.60E+02	No	1.87E+02	Yes	No	9.00E+01	Yes	Yes	>DC	No
Benzo(b)fluoranthene	ug/kg	10	60%	1.64E+02	9.70E+02	No	1.79E+02	Yes	No	9.00E+02	Yes	Yes	>DC	No
Benzo(g,h,i)perylene	ug/kg	10	50%	1.54E+02	8.30E+02	No	1.27E+02	Yes	No	2.30E+06	No	No	<DC	No
Benzo(k)fluoranthene	ug/kg	10	40%	1.78E+02	1.00E+03	No	2.08E+02	Yes	No	9.00E+03	No	No	<DC	No
Beryllium	mg/kg	10	90%	5.87E-01	1.10E+00	No	1.51E+00	No	Yes	1.56E+02	No	No	<DC	No
beta-BHC	ug/kg	10	10%	3.38E-01	7.50E-01	No	ND	--	No	1.00E+02	No	No	<DC	No
bis(2-Ethylhexyl)phthalate	ug/kg	10	40%	1.31E+02	4.30E+02	No	3.22E+02	Yes	No	4.60E+04	No	No	<DC	No
Cadmium	mg/kg	10	100%	2.34E+00	3.80E+00	No	8.65E+00	No	Yes	7.80E+01	No	No	<DC	No
Calcium	mg/kg	10	100%	3.27E+04	2.50E+05	Yes	3.35E+04	Yes	Yes	NA	No	No	EN	--
Carbazole	ug/kg	10	10%	8.80E+01	8.80E+01	No	6.40E+01	Yes	No	3.20E+04	No	No	<DC	No
Chromium	mg/kg	10	100%	1.59E+01	2.30E+01	No	3.93E+01	No	Yes	2.70E+02	No	No	<DC	No
Chrysene	ug/kg	10	70%	1.63E+02	9.80E+02	No	2.73E+02	Yes	No	8.80E+04	No	No	<DC	No
Cobalt	mg/kg	10	100%	6.50E+00	1.00E+01	No	1.55E+01	No	Yes	4.70E+03	No	No	<DC	No
Copper	mg/kg	10	100%	6.56E+01	7.90E+01	No	2.09E+02	No	Yes	2.90E+03	No	No	<DC	No
Dibenzo(a,h)anthracene	ug/kg	10	10%	7.15E+01	2.50E+02	No	ND	--	No	9.00E+01	Yes	Yes	>DC	No
Dicamba	ug/kg	10	20%	8.80E+00	2.30E+01	No	ND	--	No	1.80E+06	No	No	<DC	No
Dieldrin	ug/kg	10	40%	9.28E-01	1.08E+00	No	ND	--	No	4.00E+01	No	No	<DC	No
Endrin ketone	ug/kg	10	20%	4.60E-01	7.50E-01	No	ND	--	No	2.30E+04	No	No	<DC	No
Fluoranthene	ug/kg	10	60%	2.49E+02	1.50E+03	No	5.02E+02	Yes	No	3.10E+06	No	No	<DC	No
Gamma Chlordane	ug/kg	10	30%	1.40E+00	5.10E+00	No	ND	--	No	5.00E+02	No	No	<DC	No
Indeno(1,2,3-cd)pyrene	ug/kg	10	10%	1.59E+02	6.90E+02	No	ND	--	No	9.00E+02	No	No	<DC	No
Iron	mg/kg	10	100%	1.45E+04	2.20E+04	Yes	3.80E+04	No	Yes	NA	No	No	EN	--
Lead	mg/kg	10	100%	5.45E+01	9.00E+01	No	1.85E+02	No	Yes	4.00E+02	No	No	<DC	No
Magnesium	mg/kg	10	100%	6.25E+03	1.80E+04	Yes	1.72E+04	Yes	Yes	NA	No	No	EN	--
Manganese	mg/kg	10	100%	3.79E+02	6.10E+02	No	8.83E+02	No	Yes	3.70E+03	No	No	<DC	No
MCPA	ug/kg	10	20%	1.54E+03	4.00E+03	No	1.45E+04	No	Yes	3.10E+04	No	No	<DC	No

Surface Soil - Residential TACO Screen
Transect 3

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Residential Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
MCPP	ug/kg	10	20%	2.25E+03	7.70E+03	No	9.97E+03	No	Yes	6.10E+04	No	No	<DC	No
Mercury	mg/kg	10	100%	6.27E-02	9.30E-02	No	1.77E-01	No	Yes	1.00E+01	No	No	<DC	No
Methoxychlor	ug/kg	10	10%	2.60E+00	2.60E+00	No	ND	--	No	3.90E+05	No	No	<DC	No
Molybdenum	mg/kg	10	100%	7.38E-01	1.40E+00	No	2.02E+00	No	Yes	3.90E+02	No	No	<DC	No
Nickel	mg/kg	10	100%	1.86E+01	2.60E+01	No	4.27E+01	No	Yes	1.60E+03	No	No	<DC	No
Pentachlorophenol	ug/kg	10	20%	2.97E+02	7.40E+02	No	See notes	--	No	3.00E+03	No	No	<DC	No
Phenanthrene	ug/kg	10	40%	1.33E+02	5.30E+02	No	3.35E+02	Yes	No	2.30E+07	No	No	<DC	No
Potassium	mg/kg	10	100%	2.18E+03	3.70E+03	Yes	4.73E+03	No	Yes	NA	No	No	EN	--
Pyrene	ug/kg	10	30%	2.39E+02	1.40E+03	No	4.35E+02	Yes	No	2.30E+06	No	No	<DC	No
Selenium	mg/kg	10	20%	8.30E-01	3.20E+00	No	ND	--	No	3.90E+02	No	No	<DC	No
Silver	mg/kg	10	40%	2.98E-01	3.80E-01	No	1.35E+00	No	Yes	3.90E+02	No	No	<DC	No
Thallium	mg/kg	10	30%	6.93E-01	1.40E+00	No	ND	--	No	6.30E+00	No	No	<DC	No
Toluene	ug/kg	10	30%	3.17E+00	5.30E+00	No	ND	--	No	6.50E+05	No	No	<DC	No
Total PCBs	ug/kg	10	90%	6.29E+01	1.16E+02	No	See notes	--	No	1.00E+03	No	No	<DC	No
Vanadium	mg/kg	10	100%	2.68E+01	4.20E+01	No	6.90E+01	No	Yes	5.50E+02	No	No	<DC	No
Zinc	mg/kg	10	100%	2.70E+02	4.60E+02	No	8.08E+02	No	Yes	2.30E+04	No	No	<DC	No

Surface Soil - Residential TACO Screen
Transect 4

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Residential Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD-TEQ	ug/kg	5	100%	4.71E-03	7.42E-03	No	1.24E-01	No	Yes	1.00E+00	No	No	<DC	No
2,4-DB	ug/kg	10	10%	7.68E+00	3.50E+01	No	ND	--	No	4.90E+05	No	No	<DC	No
2-Butanone (MEK)	ug/kg	10	10%	1.50E+01	2.45E+01	No	ND	--	No	7.30E+06	No	No	<DC	No
2-Methylnaphthalene	ug/kg	10	20%	6.68E+01	7.20E+01	No	ND	--	No	3.10E+06	No	No	<DC	No
4,4'-DDE	ug/kg	10	40%	1.08E+00	1.50E+00	No	1.61E+01	No	Yes	2.00E+03	No	No	<DC	No
4,4'-DDT	ug/kg	10	50%	1.74E+00	3.00E+00	No	1.41E+01	No	Yes	2.00E+03	No	No	<DC	No
Acenaphthene	ug/kg	10	50%	2.11E+02	1.20E+03	No	ND	--	No	4.70E+06	No	No	<DC	No
Acenaphthylene	ug/kg	10	30%	4.93E+01	7.50E+01	No	ND	--	No	4.70E+06	No	No	<DC	No
Acetone	ug/kg	10	20%	9.68E+01	4.60E+02	No	ND	--	No	7.80E+06	No	No	<DC	No
Alpha Chlordane	ug/kg	10	40%	1.32E+00	3.10E+00	No	ND	--	No	5.00E+02	No	No	<DC	No
Aluminum	mg/kg	10	100%	9.40E+03	1.40E+04	No	2.54E+04	No	Yes	7.60E+04	No	No	<DC	No
Anthracene	ug/kg	10	60%	3.65E+02	2.30E+03	No	1.60E+02	Yes	No	2.30E+07	No	No	<DC	No
Antimony	mg/kg	10	10%	6.50E-01	6.50E-01	No	3.80E+00	No	Yes	3.10E+01	No	No	<DC	No
Arsenic	mg/kg	10	100%	6.76E+00	1.00E+01	No	1.91E+01	No	Yes	4.00E-01	Yes	No	<BK	No
Barium	mg/kg	10	100%	2.65E+02	1.20E+03	No	3.63E+02	Yes	No	5.50E+03	No	No	<DC	No
Benzo(a)anthracene	ug/kg	10	80%	7.03E+02	4.30E+03	No	2.40E+02	Yes	No	9.00E+02	Yes	Yes	>DC	No
Benzo(a)pyrene	ug/kg	10	50%	5.91E+02	3.50E+03	No	1.87E+02	Yes	No	9.00E+01	Yes	Yes	>DC	No
Benzo(b)fluoranthene	ug/kg	10	50%	5.98E+02	3.50E+03	No	1.79E+02	Yes	No	9.00E+02	Yes	Yes	>DC	No
Benzo(g,h,i)perylene	ug/kg	10	40%	3.93E+02	2.20E+03	No	1.27E+02	Yes	No	2.30E+06	No	No	<DC	No
Benzo(k)fluoranthene	ug/kg	10	50%	5.42E+02	3.30E+03	No	2.08E+02	Yes	No	9.00E+03	No	No	<DC	No
Beryllium	mg/kg	10	100%	5.83E-01	8.60E-01	No	1.51E+00	No	Yes	1.56E+02	No	No	<DC	No
beta-BHC	ug/kg	10	40%	4.41E-01	1.30E+00	No	ND	--	No	1.00E+02	No	No	<DC	No
bis(2-Ethylhexyl)phthalate	ug/kg	10	10%	6.60E+01	6.60E+01	No	3.22E+02	No	Yes	4.60E+04	No	No	<DC	No
Cadmium	mg/kg	10	100%	1.62E+00	3.20E+00	No	8.65E+00	No	Yes	7.80E+01	No	No	<DC	No
Calcium	mg/kg	10	100%	5.13E+04	1.50E+05	Yes	3.35E+04	Yes	Yes	NA	No	No	EN	--
Carbazole	ug/kg	10	50%	1.88E+02	1.00E+03	No	6.40E+01	Yes	No	3.20E+04	No	No	<DC	No
Chromium	mg/kg	10	100%	1.76E+01	2.90E+01	No	3.93E+01	No	Yes	2.70E+02	No	No	<DC	No
Chrysene	ug/kg	10	90%	7.10E+02	4.40E+03	No	2.73E+02	Yes	No	8.80E+04	No	No	<DC	No
Cobalt	mg/kg	10	100%	6.40E+00	1.00E+01	No	1.55E+01	No	Yes	4.70E+03	No	No	<DC	No
Copper	mg/kg	10	100%	6.51E+01	1.80E+02	No	2.09E+02	No	Yes	2.90E+03	No	No	<DC	No
delta-BHC	ug/kg	10	40%	1.64E-01	2.40E-01	No	ND	--	No	1.00E+02	No	No	<DC	No
Dibenzo(a,h)anthracene	ug/kg	10	10%	1.31E+02	8.10E+02	No	ND	--	No	9.00E+01	Yes	Yes	>DC	No
Dibenzofuran	ug/kg	10	30%	1.63E+02	7.70E+02	No	ND	--	No	2.90E+05	No	No	<DC	No
Dicamba	ug/kg	10	20%	1.63E+00	1.75E+00	No	ND	--	No	1.80E+06	No	No	<DC	No
Dieldrin	ug/kg	10	60%	2.84E+00	1.00E+01	No	ND	--	No	4.00E+01	No	No	<DC	No
Endosulfan sulfate	ug/kg	10	20%	1.20E-01	1.40E-01	No	ND	--	No	4.70E+05	No	No	<DC	No
Endrin ketone	ug/kg	10	40%	1.90E+00	4.00E+00	No	ND	--	No	2.30E+04	No	No	<DC	No
Fluoranthene	ug/kg	10	90%	1.58E+03	1.00E+04	No	5.02E+02	Yes	No	3.10E+06	No	No	<DC	No
Fluorene	ug/kg	10	40%	2.33E+02	1.40E+03	No	ND	--	No	3.10E+06	No	No	<DC	No
Gamma Chlordane	ug/kg	10	40%	1.83E+00	6.60E+00	No	ND	--	No	5.00E+02	No	No	<DC	No
Heptachlor	ug/kg	10	20%	4.90E-01	6.40E-01	No	ND	--	No	1.00E+02	No	No	<DC	No

Surface Soil - Residential TACO Screen
Transect 4

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Residential Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Heptachlor epoxide	ug/kg	10	30%	1.01E+00	2.30E+00	No	ND	--	No	7.00E+01	No	No	<DC	No
Indeno(1,2,3-cd)pyrene	ug/kg	10	40%	3.55E+02	2.00E+03	No	ND	--	No	9.00E+02	Yes	Yes	>DC	No
Iron	mg/kg	10	100%	1.54E+04	2.10E+04	Yes	3.80E+04	No	Yes	NA	No	No	EN	--
Lead	mg/kg	10	100%	1.00E+02	2.60E+02	No	1.85E+02	Yes	No	4.00E+02	No	No	<DC	No
Magnesium	mg/kg	10	100%	7.63E+03	2.10E+04	Yes	1.72E+04	Yes	Yes	NA	No	No	EN	--
Manganese	mg/kg	10	100%	4.14E+02	6.10E+02	No	8.83E+02	No	Yes	3.70E+03	No	No	<DC	No
MCPA	ug/kg	10	30%	1.57E+03	3.70E+03	No	1.45E+04	No	Yes	3.10E+04	No	No	<DC	No
Mercury	mg/kg	10	100%	1.22E-01	5.70E-01	No	1.77E-01	Yes	No	1.00E+01	No	No	<DC	No
Methoxychlor	ug/kg	10	50%	6.20E+00	9.70E+00	No	ND	--	No	3.90E+05	No	No	<DC	No
Molybdenum	mg/kg	10	100%	1.02E+00	2.30E+00	No	2.02E+00	Yes	No	3.90E+02	No	No	<DC	No
Naphthalene	ug/kg	10	20%	6.00E+01	7.90E+01	No	ND	--	No	3.10E+06	No	No	<DC	No
Nickel	mg/kg	10	100%	1.82E+01	2.40E+01	No	4.27E+01	No	Yes	1.60E+03	No	No	<DC	No
Pentachlorophenol	ug/kg	10	100%	2.89E+02	5.03E+02	No	See notes	--	No	3.00E+03	No	No	<DC	No
Phenanthrene	ug/kg	10	70%	1.35E+03	9.20E+03	No	3.35E+02	Yes	No	2.30E+07	No	No	<DC	No
Potassium	mg/kg	10	100%	1.84E+03	2.60E+03	Yes	4.73E+03	No	Yes	NA	No	No	EN	--
Pyrene	ug/kg	10	70%	1.35E+03	8.50E+03	No	4.35E+02	Yes	No	2.30E+06	No	No	<DC	No
Selenium	mg/kg	10	10%	5.79E-01	8.80E-01	No	ND	--	No	3.90E+02	No	No	<DC	No
Silver	mg/kg	10	30%	3.25E-01	4.45E-01	No	1.35E+00	No	Yes	3.90E+02	No	No	<DC	No
Thallium	mg/kg	10	30%	6.64E-01	1.10E+00	No	ND	--	No	6.30E+00	No	No	<DC	No
Toluene	ug/kg	10	10%	2.86E+00	4.50E+00	No	ND	--	No	6.50E+05	No	No	<DC	No
Total PCBs	ug/kg	10	50%	3.21E+01	5.80E+01	No	See notes	--	No	1.00E+03	No	No	<DC	No
Vanadium	mg/kg	10	100%	2.58E+01	3.50E+01	No	6.90E+01	No	Yes	5.50E+02	No	No	<DC	No
Zinc	mg/kg	10	100%	2.22E+02	5.50E+02	No	8.08E+02	No	Yes	2.30E+04	No	No	<DC	No

Surface Soil - Residential TACO Screen
Transect 5

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Residential Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD-TEQ	ug/kg	4	100%	7.87E-03	2.18E-02	No	1.24E-01	No	Yes	1.00E+00	No	No	<DC	No
2,4-DB	ug/kg	9	22%	8.15E+00	2.30E+01	No	ND	--	No	4.90E+05	No	No	<DC	No
2-Butanone (MEK)	ug/kg	9	56%	1.83E+01	3.40E+01	No	ND	--	No	7.30E+06	No	No	<DC	No
4,4'-DDD	ug/kg	9	11%	6.73E+00	3.60E+01	No	ND	--	No	3.00E+03	No	No	<DC	No
4,4'-DDE	ug/kg	9	33%	3.15E+00	8.30E+00	No	1.61E+01	No	Yes	2.00E+03	No	No	<DC	No
4,4'-DDT	ug/kg	9	33%	1.67E+01	1.10E+02	No	1.41E+01	Yes	No	2.00E+03	No	No	<DC	No
Acenaphthylene	ug/kg	9	11%	3.40E+01	3.40E+01	No	ND	--	No	4.70E+06	No	No	<DC	No
Acetone	ug/kg	9	56%	1.37E+02	4.60E+02	No	ND	--	No	7.80E+06	No	No	<DC	No
Aldrin	ug/kg	9	11%	3.96E+00	2.30E+01	No	ND	--	No	4.00E+01	No	No	<DC	No
Alpha Chlordane	ug/kg	9	33%	8.12E+00	5.40E+01	No	ND	--	No	5.00E+02	No	No	<DC	No
Aluminum	mg/kg	9	100%	8.37E+03	1.10E+04	No	2.54E+04	No	Yes	7.60E+04	No	No	<DC	No
Anthracene	ug/kg	9	11%	8.90E+01	8.90E+01	No	1.60E+02	No	Yes	2.30E+07	No	No	<DC	No
Antimony	mg/kg	9	33%	7.18E-01	9.05E-01	No	3.80E+00	No	Yes	3.10E+01	No	No	<DC	No
Arsenic	mg/kg	9	100%	6.33E+00	7.60E+00	No	1.91E+01	No	Yes	4.00E-01	Yes	No	<BK	No
Barium	mg/kg	9	100%	1.74E+02	1.90E+02	No	3.63E+02	No	Yes	5.50E+03	No	No	<DC	No
Benzene	ug/kg	9	11%	1.80E+00	1.80E+00	No	ND	--	No	8.00E+02	No	No	<DC	No
Benzo(a)anthracene	ug/kg	9	67%	1.21E+02	4.60E+02	No	2.40E+02	Yes	No	9.00E+02	No	No	<DC	No
Benzo(a)pyrene	ug/kg	9	44%	1.38E+02	6.00E+02	No	1.87E+02	Yes	No	9.00E+01	Yes	Yes	>DC	No
Benzo(b)fluoranthene	ug/kg	9	67%	1.78E+02	7.80E+02	No	1.79E+02	Yes	No	9.00E+02	No	No	<DC	No
Benzo(g,h,i)perylene	ug/kg	9	44%	1.58E+02	4.30E+02	No	1.27E+02	Yes	No	2.30E+06	No	No	<DC	No
Benzo(k)fluoranthene	ug/kg	9	44%	1.59E+02	6.00E+02	No	2.08E+02	Yes	No	9.00E+03	No	No	<DC	No
Beryllium	mg/kg	9	100%	5.29E-01	6.60E-01	No	1.51E+00	No	Yes	1.56E+02	No	No	<DC	No
beta-BHC	ug/kg	9	11%	1.00E-01	1.00E-01	No	ND	--	No	1.00E+02	No	No	<DC	No
bis(2-Ethylhexyl)phthalate	ug/kg	9	44%	1.06E+02	1.80E+02	No	3.22E+02	No	Yes	4.60E+04	No	No	<DC	No
Butylbenzylphthalate	ug/kg	9	11%	1.22E+02	3.40E+02	No	ND	--	No	9.30E+05	No	No	<DC	No
Cadmium	mg/kg	9	100%	3.42E+00	8.40E+00	No	8.65E+00	No	Yes	7.80E+01	No	No	<DC	No
Calcium	mg/kg	9	100%	9.93E+03	2.05E+04	Yes	3.35E+04	No	Yes	NA	No	No	EN	--
Carbazole	ug/kg	9	11%	7.10E+01	7.10E+01	No	6.40E+01	Yes	No	3.20E+04	No	No	<DC	No
Chromium	mg/kg	9	100%	1.46E+01	1.85E+01	No	3.93E+01	No	Yes	2.70E+02	No	No	<DC	No
Chrysene	ug/kg	9	67%	1.70E+02	7.10E+02	No	2.73E+02	Yes	No	8.80E+04	No	No	<DC	No
Cobalt	mg/kg	9	100%	5.99E+00	6.90E+00	No	1.55E+01	No	Yes	4.70E+03	No	No	<DC	No
Copper	mg/kg	9	100%	5.42E+01	8.45E+01	No	2.09E+02	No	Yes	2.90E+03	No	No	<DC	No
Dibenzo(a,h)anthracene	ug/kg	9	44%	9.86E+01	3.20E+02	No	ND	--	No	9.00E+01	Yes	Yes	>DC	No
Dicamba	ug/kg	9	22%	2.10E+00	2.90E+00	No	ND	--	No	1.80E+06	No	No	<DC	No
Dieldrin	ug/kg	9	22%	1.58E+01	1.20E+02	No	ND	--	No	4.00E+01	Yes	Yes	>DC	No
Diethylphthalate	ug/kg	9	11%	3.90E+01	3.90E+01	No	1.87E+02	No	Yes	2.00E+06	No	No	<DC	No
Di-n-butylphthalate	ug/kg	9	22%	3.35E+01	3.50E+01	No	3.12E+02	No	Yes	2.30E+06	No	No	<DC	No
Endrin	ug/kg	9	11%	2.62E+00	6.10E+00	No	ND	--	No	2.30E+04	No	No	<DC	No
Endrin aldehyde	ug/kg	9	22%	2.29E+00	5.06E+00	No	ND	--	No	2.30E+04	No	No	<DC	No
Endrin ketone	ug/kg	9	11%	2.47E+00	4.95E+00	No	ND	--	No	2.30E+04	No	No	<DC	No
Fluoranthene	ug/kg	9	56%	2.43E+02	1.10E+03	No	5.02E+02	Yes	No	3.10E+06	No	No	<DC	No

Surface Soil - Residential TACO Screen
Transect 5

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Residential Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Gamma Chlordane	ug/kg	9	22%	1.77E+01	7.80E+01	No	ND	--	No	5.00E+02	No	No	<DC	No
Heptachlor	ug/kg	9	11%	1.15E+01	9.10E+01	No	ND	--	No	1.00E+02	No	No	<DC	No
Heptachlor epoxide	ug/kg	9	22%	4.94E+00	3.00E+01	No	ND	--	No	7.00E+01	No	No	<DC	No
Indeno(1,2,3-cd)pyrene	ug/kg	9	56%	1.71E+02	4.50E+02	No	ND	--	No	9.00E+02	No	No	<DC	No
Iron	mg/kg	9	100%	1.39E+04	1.60E+04	Yes	3.80E+04	No	Yes	NA	No	No	EN	--
Lead	mg/kg	9	100%	8.03E+01	1.70E+02	No	1.85E+02	No	Yes	4.00E+02	No	No	<DC	No
Magnesium	mg/kg	9	100%	4.13E+03	5.00E+03	Yes	1.72E+04	No	Yes	NA	No	No	EN	--
Manganese	mg/kg	9	100%	3.48E+02	4.00E+02	No	8.83E+02	No	Yes	3.70E+03	No	No	<DC	No
MCPA	ug/kg	9	22%	1.58E+03	4.40E+03	No	1.45E+04	No	Yes	3.10E+04	No	No	<DC	No
MCPP	ug/kg	9	67%	2.95E+03	6.80E+03	No	9.97E+03	No	Yes	6.10E+04	No	No	<DC	No
Mercury	mg/kg	9	100%	6.97E-02	1.15E-01	No	1.77E-01	No	Yes	1.00E+01	No	No	<DC	No
Methoxychlor	ug/kg	9	33%	1.47E+01	3.80E+01	No	ND	--	No	3.90E+05	No	No	<DC	No
Molybdenum	mg/kg	9	100%	4.64E-01	7.80E-01	No	2.02E+00	No	Yes	3.90E+02	No	No	<DC	No
Nickel	mg/kg	9	100%	1.68E+01	1.90E+01	No	4.27E+01	No	Yes	1.60E+03	No	No	<DC	No
Pentachlorophenol	ug/kg	9	33%	2.34E+02	2.41E+02	No	See notes	--	No	3.00E+03	No	No	<DC	No
Phenanthrene	ug/kg	9	67%	1.01E+02	3.60E+02	No	3.35E+02	Yes	No	2.30E+07	No	No	<DC	No
Potassium	mg/kg	9	100%	1.76E+03	2.40E+03	Yes	4.73E+03	No	Yes	NA	No	No	EN	--
Pyrene	ug/kg	9	56%	1.99E+02	8.10E+02	No	4.35E+02	Yes	No	2.30E+06	No	No	<DC	No
Selenium	mg/kg	9	11%	4.80E-01	4.80E-01	No	ND	--	No	3.90E+02	No	No	<DC	No
Silver	mg/kg	9	33%	5.01E-01	6.00E-01	No	1.35E+00	No	Yes	3.90E+02	No	No	<DC	No
Toluene	ug/kg	9	11%	2.70E+00	2.80E+00	No	ND	--	No	6.50E+05	No	No	<DC	No
Total PCBs	ug/kg	9	78%	6.67E+01	1.65E+02	No	See notes	--	No	1.00E+03	No	No	<DC	No
Vanadium	mg/kg	9	100%	2.43E+01	2.90E+01	No	6.90E+01	No	Yes	5.50E+02	No	No	<DC	No
Zinc	mg/kg	9	100%	3.74E+02	9.80E+02	No	8.08E+02	Yes	No	2.30E+04	No	No	<DC	No

Surface Soil - Residential TACO Screen
Transect 6

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Residential Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD-TEQ	ug/kg	4	100%	6.37E-03	1.32E-02	No	1.24E-01	No	Yes	1.00E+00	No	No	<DC	No
4,4'-DDD	ug/kg	8	25%	2.93E+00	6.40E+00	No	ND	--	No	3.00E+03	No	No	<DC	No
4,4'-DDE	ug/kg	8	75%	5.35E+00	1.80E+01	No	1.61E+01	Yes	No	2.00E+03	No	No	<DC	No
4,4'-DDT	ug/kg	8	38%	3.56E+01	1.40E+02	No	1.41E+01	Yes	No	2.00E+03	No	No	<DC	No
Acenaphthene	ug/kg	8	25%	1.26E+02	4.20E+02	No	ND	--	No	4.70E+06	No	No	<DC	No
Acetone	ug/kg	8	38%	1.05E+02	4.20E+02	No	ND	--	No	7.80E+06	No	No	<DC	No
Alpha Chlordane	ug/kg	8	25%	4.52E+00	1.70E+01	No	ND	--	No	5.00E+02	No	No	<DC	No
alpha-BHC	ug/kg	8	13%	2.20E-01	2.20E-01	No	ND	--	No	1.00E+02	No	No	<DC	No
Aluminum	mg/kg	8	100%	7.98E+03	9.70E+03	No	2.54E+04	No	Yes	7.60E+04	No	No	<DC	No
Anthracene	ug/kg	8	38%	2.43E+02	1.40E+03	No	1.60E+02	Yes	No	2.30E+07	No	No	<DC	No
Antimony	mg/kg	8	50%	6.88E-01	7.70E-01	No	3.80E+00	No	Yes	3.10E+01	No	No	<DC	No
Arsenic	mg/kg	8	100%	6.01E+00	9.20E+00	No	1.91E+01	No	Yes	4.00E-01	Yes	No	<BK	No
Barium	mg/kg	8	100%	1.50E+02	2.00E+02	No	3.63E+02	No	Yes	5.50E+03	No	No	<DC	No
Benzo(a)anthracene	ug/kg	8	88%	6.06E+02	4.20E+03	No	2.40E+02	Yes	No	9.00E+02	Yes	Yes	>DC	No
Benzo(a)pyrene	ug/kg	8	25%	5.04E+02	3.60E+03	No	1.87E+02	Yes	No	9.00E+01	Yes	Yes	>DC	No
Benzo(b)fluoranthene	ug/kg	8	88%	6.34E+02	4.40E+03	No	1.79E+02	Yes	No	9.00E+02	Yes	Yes	>DC	No
Benzo(g,h,i)perylene	ug/kg	8	13%	2.48E+02	1.30E+03	No	1.27E+02	Yes	No	2.30E+06	No	No	<DC	No
Benzo(k)fluoranthene	ug/kg	8	25%	5.03E+02	3.40E+03	No	2.08E+02	Yes	No	9.00E+03	No	No	<DC	No
Beryllium	mg/kg	8	88%	4.90E-01	8.60E-01	No	1.51E+00	No	Yes	1.56E+02	No	No	<DC	No
beta-BHC	ug/kg	8	13%	1.34E+00	3.80E+00	No	ND	--	No	1.00E+02	No	No	<DC	No
bis(2-Ethylhexyl)phthalate	ug/kg	8	25%	1.19E+02	3.60E+02	No	3.22E+02	Yes	No	4.60E+04	No	No	<DC	No
Butylbenzylphthalate	ug/kg	8	13%	5.70E+01	5.70E+01	No	ND	--	No	9.30E+05	No	No	<DC	No
Cadmium	mg/kg	8	100%	1.50E+00	4.00E+00	No	8.65E+00	No	Yes	7.80E+01	No	No	<DC	No
Calcium	mg/kg	8	100%	6.26E+04	1.50E+05	Yes	3.35E+04	Yes	Yes	NA	No	No	EN	--
Carbazole	ug/kg	8	13%	1.91E+02	8.60E+02	No	6.40E+01	Yes	No	3.20E+04	No	No	<DC	No
Chromium	mg/kg	8	100%	1.44E+01	1.80E+01	No	3.93E+01	No	Yes	2.70E+02	No	No	<DC	No
Chrysene	ug/kg	8	88%	7.12E+02	4.90E+03	No	2.73E+02	Yes	No	8.80E+04	No	No	<DC	No
Cobalt	mg/kg	8	100%	5.96E+00	9.20E+00	No	1.55E+01	No	Yes	4.70E+03	No	No	<DC	No
Copper	mg/kg	8	100%	2.93E+01	5.60E+01	No	2.09E+02	No	Yes	2.90E+03	No	No	<DC	No
delta-BHC	ug/kg	8	13%	1.20E-01	1.20E-01	No	ND	--	No	1.00E+02	No	No	<DC	No
Dibenzo(a,h)anthracene	ug/kg	8	38%	1.18E+02	6.00E+02	No	ND	--	No	9.00E+01	Yes	Yes	>DC	No
Dibenzofuran	ug/kg	8	13%	1.12E+02	2.30E+02	No	ND	--	No	2.90E+05	No	No	<DC	No
Dicamba	ug/kg	8	25%	2.35E+00	3.00E+00	No	ND	--	No	1.80E+06	No	No	<DC	No
Dieldrin	ug/kg	8	13%	1.80E+00	1.80E+00	No	ND	--	No	4.00E+01	No	No	<DC	No
Endosulfan sulfate	ug/kg	8	38%	1.14E+00	1.90E+00	No	ND	--	No	4.70E+05	No	No	<DC	No
Endrin	ug/kg	8	13%	1.99E+00	2.20E+00	No	ND	--	No	2.30E+04	No	No	<DC	No
Endrin aldehyde	ug/kg	8	13%	7.50E-01	7.50E-01	No	ND	--	No	2.30E+04	No	No	<DC	No
Endrin ketone	ug/kg	8	25%	4.50E-01	6.70E-01	No	ND	--	No	2.30E+04	No	No	<DC	No
Fluoranthene	ug/kg	8	88%	1.38E+03	9.80E+03	No	5.02E+02	Yes	No	3.10E+06	No	No	<DC	No
Fluorene	ug/kg	8	13%	1.56E+02	5.80E+02	No	ND	--	No	3.10E+06	No	No	<DC	No
Gamma Chlordane	ug/kg	8	25%	4.70E+00	1.80E+01	No	ND	--	No	5.00E+02	No	No	<DC	No

Surface Soil - Residential TACO Screen
Transect 6

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Residential Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
gamma-BHC (Lindane)	ug/kg	8	13%	1.30E-01	1.30E-01	No	ND	--	No	5.00E+02	No	No	<DC	No
Heptachlor	ug/kg	8	13%	1.78E+00	4.10E+00	No	ND	--	No	1.00E+02	No	No	<DC	No
Heptachlor epoxide	ug/kg	8	13%	1.80E-01	1.80E-01	No	ND	--	No	7.00E+01	No	No	<DC	No
Indeno(1,2,3-cd)pyrene	ug/kg	8	50%	2.20E+02	1.10E+03	No	ND	--	No	9.00E+02	Yes	Yes	>DC	No
Iron	mg/kg	8	100%	1.36E+04	1.90E+04	Yes	3.80E+04	No	Yes	NA	No	No	EN	--
Lead	mg/kg	8	100%	5.54E+01	1.10E+02	No	1.85E+02	No	Yes	4.00E+02	No	No	<DC	No
Magnesium	mg/kg	8	100%	8.71E+03	1.60E+04	Yes	1.72E+04	Yes	Yes	NA	No	No	EN	--
Manganese	mg/kg	8	100%	3.85E+02	6.60E+02	No	8.83E+02	No	Yes	3.70E+03	No	No	<DC	No
MCPP	ug/kg	8	13%	1.55E+03	4.50E+03	No	9.97E+03	No	Yes	6.10E+04	No	No	<DC	No
Mercury	mg/kg	8	100%	5.73E-02	8.60E-02	No	1.77E-01	No	Yes	1.00E+01	No	No	<DC	No
Methoxychlor	ug/kg	8	38%	3.60E+00	5.50E+00	No	ND	--	No	3.90E+05	No	No	<DC	No
Molybdenum	mg/kg	8	100%	8.40E-01	3.20E+00	No	2.02E+00	Yes	No	3.90E+02	No	No	<DC	No
Nickel	mg/kg	8	100%	1.73E+01	2.30E+01	No	4.27E+01	No	Yes	1.60E+03	No	No	<DC	No
Pentachlorophenol	ug/kg	8	63%	2.40E+02	2.49E+02	No	See notes	--	No	3.00E+03	No	No	<DC	No
Phenanthrene	ug/kg	8	75%	9.75E+02	7.10E+03	No	3.35E+02	Yes	No	2.30E+07	No	No	<DC	No
Potassium	mg/kg	8	100%	1.78E+03	2.40E+03	Yes	4.73E+03	No	Yes	NA	No	No	EN	--
Pyrene	ug/kg	8	75%	1.11E+03	7.70E+03	No	4.35E+02	Yes	No	2.30E+06	No	No	<DC	No
Selenium	mg/kg	8	13%	5.66E-01	6.80E-01	No	ND	--	No	3.90E+02	No	No	<DC	No
Silver	mg/kg	8	13%	2.90E-01	2.90E-01	No	1.35E+00	No	Yes	3.90E+02	No	No	<DC	No
Thallium	mg/kg	8	25%	6.19E-01	9.70E-01	No	ND	--	No	6.30E+00	No	No	<DC	No
Toluene	ug/kg	8	13%	2.20E+00	2.20E+00	No	ND	--	No	6.50E+05	No	No	<DC	No
Total PCBs	ug/kg	8	75%	8.31E+01	3.85E+02	No	See notes	--	No	1.00E+03	No	No	<DC	No
Vanadium	mg/kg	8	100%	2.54E+01	3.30E+01	No	6.90E+01	No	Yes	5.50E+02	No	No	<DC	No
Zinc	mg/kg	8	100%	1.56E+02	3.50E+02	No	8.08E+02	No	Yes	2.30E+04	No	No	<DC	No

Surface Soil - Residential TACO Screen
Transect 7

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Residential Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD-TEQ	ug/kg	3	100%	2.80E-03	5.23E-03	No	1.24E-01	No	Yes	1.00E+00	No	No	<DC	No
2-Butanone (MEK)	ug/kg	9	33%	1.84E+01	3.70E+01	No	ND	--	No	7.30E+06	No	No	<DC	No
2-Methylnaphthalene	ug/kg	9	11%	6.50E+01	6.50E+01	No	ND	--	No	3.10E+06	No	No	<DC	No
4,4'-DDD	ug/kg	9	11%	1.30E+00	1.30E+00	No	ND	--	No	3.00E+03	No	No	<DC	No
4,4'-DDE	ug/kg	9	78%	9.80E+00	5.40E+01	No	1.61E+01	Yes	No	2.00E+03	No	No	<DC	No
4,4'-DDT	ug/kg	9	67%	7.71E+00	2.90E+01	No	1.41E+01	Yes	No	2.00E+03	No	No	<DC	No
Acenaphthene	ug/kg	9	22%	9.77E+01	1.60E+02	No	ND	--	No	4.70E+06	No	No	<DC	No
Acetone	ug/kg	9	56%	1.85E+02	5.00E+02	No	ND	--	No	7.80E+06	No	No	<DC	No
Alpha Chlordane	ug/kg	9	22%	2.40E+00	1.10E+01	No	ND	--	No	5.00E+02	No	No	<DC	No
Aluminum	mg/kg	9	100%	8.33E+03	1.20E+04	No	2.54E+04	No	Yes	7.60E+04	No	No	<DC	No
Anthracene	ug/kg	9	33%	1.18E+02	3.60E+02	No	1.60E+02	Yes	No	2.30E+07	No	No	<DC	No
Antimony	mg/kg	9	11%	5.23E-01	7.30E-01	No	3.80E+00	No	Yes	3.10E+01	No	No	<DC	No
Arsenic	mg/kg	9	100%	9.99E+00	3.40E+01	No	1.91E+01	Yes	No	4.00E-01	Yes	Yes	>DC	No
Barium	mg/kg	9	100%	1.67E+02	2.00E+02	No	3.63E+02	No	Yes	5.50E+03	No	No	<DC	No
Benzene	ug/kg	9	22%	3.14E+00	4.80E+00	No	ND	--	No	8.00E+02	No	No	<DC	No
Benzo(a)anthracene	ug/kg	9	100%	3.42E+02	1.90E+03	No	2.40E+02	Yes	No	9.00E+02	Yes	Yes	>DC	No
Benzo(a)pyrene	ug/kg	9	100%	3.74E+02	2.10E+03	No	1.87E+02	Yes	No	9.00E+01	Yes	Yes	>DC	No
Benzo(b)fluoranthene	ug/kg	9	100%	4.06E+02	2.20E+03	No	1.79E+02	Yes	No	9.00E+02	Yes	Yes	>DC	No
Benzo(g,h,i)perylene	ug/kg	9	100%	2.29E+02	1.10E+03	No	1.27E+02	Yes	No	2.30E+06	No	No	<DC	No
Benzo(k)fluoranthene	ug/kg	9	100%	3.54E+02	2.10E+03	No	2.08E+02	Yes	No	9.00E+03	No	No	<DC	No
Beryllium	mg/kg	9	33%	4.23E-01	8.25E-01	No	1.51E+00	No	Yes	1.56E+02	No	No	<DC	No
bis(2-Ethylhexyl)phthalate	ug/kg	9	44%	7.18E+01	9.10E+01	No	3.22E+02	No	Yes	4.60E+04	No	No	<DC	No
Butylbenzylphthalate	ug/kg	9	11%	5.80E+01	5.80E+01	No	ND	--	No	9.30E+05	No	No	<DC	No
Cadmium	mg/kg	9	100%	3.12E+00	6.10E+00	No	8.65E+00	No	Yes	7.80E+01	No	No	<DC	No
Calcium	mg/kg	9	100%	1.46E+04	3.80E+04	Yes	3.35E+04	Yes	Yes	NA	No	No	EN	--
Carbazole	ug/kg	9	33%	1.16E+02	3.10E+02	No	6.40E+01	Yes	No	3.20E+04	No	No	<DC	No
Carbon disulfide	ug/kg	9	22%	3.17E+00	4.30E+00	No	ND	--	No	7.20E+05	No	No	<DC	No
Chromium	mg/kg	9	100%	1.53E+01	2.00E+01	No	3.93E+01	No	Yes	2.70E+02	No	No	<DC	No
Chrysene	ug/kg	9	100%	4.86E+02	2.60E+03	No	2.73E+02	Yes	No	8.80E+04	No	No	<DC	No
Cobalt	mg/kg	9	100%	6.63E+00	7.80E+00	No	1.55E+01	No	Yes	4.70E+03	No	No	<DC	No
Copper	mg/kg	9	100%	4.29E+01	1.30E+02	No	2.09E+02	No	Yes	2.90E+03	No	No	<DC	No
delta-BHC	ug/kg	9	11%	1.80E-01	1.80E-01	No	ND	--	No	1.00E+02	No	No	<DC	No
Dibenzo(a,h)anthracene	ug/kg	9	33%	1.03E+02	4.10E+02	No	ND	--	No	9.00E+01	Yes	Yes	>DC	No
Dibenzofuran	ug/kg	9	11%	5.20E+01	5.20E+01	No	ND	--	No	2.90E+05	No	No	<DC	No
Dicamba	ug/kg	9	11%	2.65E+00	2.65E+00	No	ND	--	No	1.80E+06	No	No	<DC	No
Dieldrin	ug/kg	9	22%	1.81E+00	3.00E+00	No	ND	--	No	4.00E+01	No	No	<DC	No
Di-n-butylphthalate	ug/kg	9	78%	8.86E+01	1.70E+02	No	3.12E+02	No	Yes	2.30E+06	No	No	<DC	No
Endosulfan II	ug/kg	9	11%	1.00E+00	1.00E+00	No	ND	--	No	4.70E+05	No	No	<DC	No
Endrin	ug/kg	9	22%	2.50E-01	4.00E-01	No	ND	--	No	2.30E+04	No	No	<DC	No
Endrin ketone	ug/kg	9	44%	1.40E+00	1.90E+00	No	ND	--	No	2.30E+04	No	No	<DC	No
Ethylbenzene	ug/kg	9	11%	2.75E+00	3.00E+00	No	ND	--	No	4.00E+05	No	No	<DC	No

Surface Soil - Residential TACO Screen
Transect 7

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Residential Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Fluoranthene	ug/kg	9	100%	9.66E+02	5.60E+03	No	5.02E+02	Yes	No	3.10E+06	No	No	<DC	No
Fluorene	ug/kg	9	22%	9.51E+01	1.40E+02	No	ND	--	No	3.10E+06	No	No	<DC	No
Gamma Chlordane	ug/kg	9	44%	1.97E+00	1.00E+01	No	ND	--	No	5.00E+02	No	No	<DC	No
gamma-BHC (Lindane)	ug/kg	9	11%	8.70E-02	8.70E-02	No	ND	--	No	5.00E+02	No	No	<DC	No
Heptachlor epoxide	ug/kg	9	22%	4.40E-01	6.20E-01	No	ND	--	No	7.00E+01	No	No	<DC	No
Indeno(1,2,3-cd)pyrene	ug/kg	9	44%	2.40E+02	1.10E+03	No	ND	--	No	9.00E+02	Yes	Yes	>DC	No
Iron	mg/kg	9	100%	1.47E+04	1.75E+04	Yes	3.80E+04	No	Yes	NA	No	No	EN	--
Lead	mg/kg	9	100%	6.46E+01	1.50E+02	No	1.85E+02	No	Yes	4.00E+02	No	No	<DC	No
Magnesium	mg/kg	9	100%	5.66E+03	1.10E+04	Yes	1.72E+04	No	Yes	NA	No	No	EN	--
Manganese	mg/kg	9	100%	3.45E+02	4.35E+02	No	8.83E+02	No	Yes	3.70E+03	No	No	<DC	No
Mercury	mg/kg	9	100%	8.51E-02	1.60E-01	No	1.77E-01	No	Yes	1.00E+01	No	No	<DC	No
Methoxychlor	ug/kg	9	56%	6.82E+00	1.00E+01	No	ND	--	No	3.90E+05	No	No	<DC	No
Molybdenum	mg/kg	9	89%	7.93E-01	1.80E+00	No	2.02E+00	No	Yes	3.90E+02	No	No	<DC	No
Nickel	mg/kg	9	100%	2.17E+01	5.50E+01	No	4.27E+01	Yes	No	1.60E+03	No	No	<DC	No
Pentachlorophenol	ug/kg	9	33%	2.41E+02	2.51E+02	No	See notes	--	No	3.00E+03	No	No	<DC	No
Phenanthrene	ug/kg	9	100%	5.09E+02	2.90E+03	No	3.35E+02	Yes	No	2.30E+07	No	No	<DC	No
Potassium	mg/kg	9	100%	2.02E+03	2.85E+03	Yes	4.73E+03	No	Yes	NA	No	No	EN	--
Pyrene	ug/kg	9	100%	6.86E+02	3.90E+03	No	4.35E+02	Yes	No	2.30E+06	No	No	<DC	No
Selenium	mg/kg	9	67%	6.93E-01	1.10E+00	No	ND	--	No	3.90E+02	No	No	<DC	No
Silver	mg/kg	9	44%	3.65E-01	4.40E-01	No	1.35E+00	No	Yes	3.90E+02	No	No	<DC	No
Thallium	mg/kg	9	11%	5.72E-01	8.50E-01	No	ND	--	No	6.30E+00	No	No	<DC	No
Toluene	ug/kg	9	44%	4.68E+00	1.20E+01	No	ND	--	No	6.50E+05	No	No	<DC	No
Total PCBs	ug/kg	9	89%	3.52E+01	9.00E+01	No	See notes	--	No	1.00E+03	No	No	<DC	No
Trichloroethene	ug/kg	9	11%	2.56E+00	2.60E+00	No	ND	--	No	5.00E+03	No	No	<DC	No
Vanadium	mg/kg	9	100%	2.47E+01	3.25E+01	No	6.90E+01	No	Yes	5.50E+02	No	No	<DC	No
Xylenes, Total	ug/kg	9	11%	3.18E+00	4.20E+00	No	ND	--	No	4.10E+05	No	No	<DC	No
Zinc	mg/kg	9	100%	3.84E+02	8.70E+02	No	8.08E+02	Yes	No	2.30E+04	No	No	<DC	No

Surface Soil - Residential TACO Screen
Fill Area N

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Residential Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD-TEQ	ug/kg	4	100%	9.76E-02	3.45E-01	No	1.24E-01	Yes	No	1.00E+00	No	No	<DC	No
4,4'-DDT	ug/kg	4	25%	2.02E+00	2.70E+00	No	1.41E+01	No	Yes	2.00E+03	No	No	<DC	No
Aldrin	ug/kg	4	25%	1.03E+00	1.28E+00	No	ND	--	No	4.00E+01	No	No	<DC	No
Alpha Chlordane	ug/kg	4	25%	9.67E-01	1.10E+00	No	ND	--	No	5.00E+02	No	No	<DC	No
Aluminum	mg/kg	4	100%	8.75E+03	1.10E+04	No	2.54E+04	No	Yes	7.60E+04	No	No	<DC	No
Anthracene	ug/kg	4	75%	4.70E+01	5.80E+01	No	1.60E+02	No	Yes	2.30E+07	No	No	<DC	No
Antimony	mg/kg	4	25%	7.10E-01	7.10E-01	No	3.80E+00	No	Yes	3.10E+01	No	No	<DC	No
Arsenic	mg/kg	4	100%	6.33E+00	7.30E+00	No	1.91E+01	No	Yes	4.00E-01	Yes	No	<BK	No
Barium	mg/kg	4	100%	5.93E+02	1.20E+03	No	3.63E+02	Yes	No	5.50E+03	No	No	<DC	No
Benzo(a)anthracene	ug/kg	4	100%	1.68E+02	2.70E+02	No	2.40E+02	Yes	No	9.00E+02	No	No	<DC	No
Benzo(a)pyrene	ug/kg	4	100%	1.87E+02	3.30E+02	No	1.87E+02	Yes	No	9.00E+01	Yes	Yes	>DC	No
Benzo(b)fluoranthene	ug/kg	4	100%	1.65E+02	3.20E+02	No	1.79E+02	Yes	No	9.00E+02	No	No	<DC	No
Benzo(g,h,i)perylene	ug/kg	4	25%	1.44E+02	3.00E+02	No	1.27E+02	Yes	No	2.30E+06	No	No	<DC	No
Benzo(k)fluoranthene	ug/kg	4	100%	2.18E+02	3.60E+02	No	2.08E+02	Yes	No	9.00E+03	No	No	<DC	No
beta-BHC	ug/kg	4	25%	2.93E-01	3.38E-01	No	ND	--	No	1.00E+02	No	No	<DC	No
bis(2-Ethylhexyl)phthalate	ug/kg	4	25%	1.01E+02	1.30E+02	No	3.22E+02	No	Yes	4.60E+04	No	No	<DC	No
Cadmium	mg/kg	4	100%	8.46E-01	1.50E+00	No	8.65E+00	No	Yes	7.80E+01	No	No	<DC	No
Calcium	mg/kg	4	100%	5.73E+04	1.09E+05	Yes	3.35E+04	Yes	Yes	NA	No	No	EN	--
Chromium	mg/kg	4	100%	1.65E+01	1.80E+01	No	3.93E+01	No	Yes	2.70E+02	No	No	<DC	No
Chrysene	ug/kg	4	100%	2.00E+02	3.10E+02	No	2.73E+02	Yes	No	8.80E+04	No	No	<DC	No
Cobalt	mg/kg	4	100%	5.84E+00	6.15E+00	No	1.55E+01	No	Yes	4.70E+03	No	No	<DC	No
Copper	mg/kg	4	100%	5.01E+01	1.10E+02	No	2.09E+02	No	Yes	2.90E+03	No	No	<DC	No
Dibenzo(a,h)anthracene	ug/kg	4	50%	7.25E+01	1.10E+02	No	ND	--	No	9.00E+01	Yes	Yes	>DC	No
Dieldrin	ug/kg	4	25%	1.89E+00	2.13E+00	No	ND	--	No	4.00E+01	No	No	<DC	No
Fluoranthene	ug/kg	4	100%	3.93E+02	8.10E+02	No	5.02E+02	Yes	No	3.10E+06	No	No	<DC	No
Gamma Chlordane	ug/kg	4	25%	1.38E+00	1.65E+00	No	ND	--	No	5.00E+02	No	No	<DC	No
Indeno(1,2,3-cd)pyrene	ug/kg	4	75%	1.44E+02	2.50E+02	No	ND	--	No	9.00E+02	No	No	<DC	No
Iron	mg/kg	4	100%	1.43E+04	1.50E+04	Yes	3.80E+04	No	Yes	NA	No	No	EN	--
Lead	mg/kg	4	100%	1.38E+02	4.10E+02	No	1.85E+02	Yes	No	4.00E+02	Yes	No	Avg<DC	No
Magnesium	mg/kg	4	100%	7.18E+03	1.15E+04	Yes	1.72E+04	No	Yes	NA	No	No	EN	--
Manganese	mg/kg	4	100%	3.74E+02	4.10E+02	No	8.83E+02	No	Yes	3.70E+03	No	No	<DC	No
Mercury	mg/kg	4	100%	6.78E-02	9.50E-02	No	1.77E-01	No	Yes	1.00E+01	No	No	<DC	No
Methoxychlor	ug/kg	4	25%	2.06E+01	5.50E+01	No	ND	--	No	3.90E+05	No	No	<DC	No
Molybdenum	mg/kg	4	100%	1.03E+00	1.45E+00	No	2.02E+00	No	Yes	3.90E+02	No	No	<DC	No
Nickel	mg/kg	4	100%	1.61E+01	1.70E+01	No	4.27E+01	No	Yes	1.60E+03	No	No	<DC	No
Pentachlorophenol	ug/kg	4	100%	3.07E+02	4.74E+02	No	See notes	--	No	3.00E+03	No	No	<DC	No
Phenanthrene	ug/kg	4	100%	1.76E+02	2.60E+02	No	3.35E+02	No	Yes	2.30E+07	No	No	<DC	No
Potassium	mg/kg	4	100%	1.40E+03	1.60E+03	Yes	4.73E+03	No	Yes	NA	No	No	EN	--
Pyrene	ug/kg	4	100%	3.41E+02	5.50E+02	No	4.35E+02	Yes	No	2.30E+06	No	No	<DC	No
Selenium	mg/kg	4	25%	5.69E-01	6.80E-01	No	ND	--	No	3.90E+02	No	No	<DC	No
Total PCBs	ug/kg	4	25%	5.13E+01	1.78E+02	No	See notes	--	No	1.00E+03	No	No	<DC	No
Vanadium	mg/kg	4	100%	2.38E+01	2.90E+01	No	6.90E+01	No	Yes	5.50E+02	No	No	<DC	No
Zinc	mg/kg	4	100%	1.49E+02	2.50E+02	No	8.08E+02	No	Yes	2.30E+04	No	No	<DC	No

APPENDIX F

COPC SELECTION FOR SOILS FOR INDUSTRIAL SCENARIOS

APPENDIX F
COPC SELECTION FOR SOILS FOR INDUSTRIAL SCENARIOS

This appendix presents the screening tables for identifying COPCs for areas evaluated under an industrial scenario. COPCs for surface soil for each transect, for subsurface soil for each transect, and for surface soil for each fill area (excluding Fill Area M, which is included in the sediment removal action) are identified using the "Industrial Soil – Direct Contact Screening Values" presented in Appendix C Table C-2. The screening tables present:

- The frequency of detection and the arithmetic mean and maximum detected concentrations as presented in Appendix B;
- An identification of essential nutrient status and comparison to background, as presented in Appendix D;
- Comparison to the TACO Tier 1 Industrial Soil – Direct Contact screening values for both the industrial worker scenario and the construction worker scenario; and
- An identification of whether or not a constituent is selected as a COPC and the reason why or why not.

The information in the last column of each table pertains to the short-term risk assessment, and will be discussed in Section 7.0 of the text.

The screening tables are presented in the following order:

- Surface soil – Transect 1
- Surface soil – Transect 2
- Surface soil – Transect 3
- Surface soil – Transect 4
- Surface soil – Transect 5
- Surface soil – Transect 6
- Surface soil – Transect 7

- Subsurface soil – Transect 1
- Subsurface soil – Transect 2
- Subsurface soil – Transect 3
- Subsurface soil – Transect 4

- Subsurface soil – Transect 5
- Subsurface soil – Transect 6
- Subsurface soil – Transect 7

- Surface soil – Fill Area G
- Surface soil – Fill Area H
- Surface soil – Fill Area I
- Surface soil – Fill Area L
- Surface soil – Fill Area N

The screening results are summarized in Section 3.3.1 of the text.

Surface Soil - Industrial TACO Screen
Transect 1

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD TEQ	ug/kg	5	100%	0.0061612	1.31E-02	No	1.24E-01	No	Yes	1.00E+00	No	1.00E+00	No	No	<Tier I	No
2,4-D	ug/kg	10	10%	3.60	3.60E+00	No	ND	--	No	2.00E+07	No	2.00E+06	No	No	<Tier I	No
2-Butanone (MEK)	ug/kg	10	20%	18.0500	3.20E+01	No	ND	--	No	2.80E+07	No	2.80E+07	No	No	<Tier I	No
2-Hexanone	ug/kg	10	10%	6.6000	6.60E+00	No	3.30E+01	No	Yes	2.90E+06	No	2.90E+06	No	No	<Tier I	No
4,4'-DDE	ug/kg	10	70%	0.3044	5.65E-01	No	1.61E+01	No	Yes	1.70E+04	No	3 70E+05	No	No	<Tier I	No
4,4'-DDT	ug/kg	10	50%	0.4805	9.33E-01	No	1.41E+01	No	Yes	1.70E+04	No	1 00E+05	No	No	<Tier I	No
Acetone	ug/kg	10	50%	178.93	4.40E+02	No	ND	--	No	1.00E+08	No	1.00E+08	No	No	<Tier I	No
Aluminum	mg/kg	10	100%	9885.0000	1.50E+04	No	2.54E+04	No	Yes	1.00E+05	No	1.00E+05	No	No	<Tier I	No
Antimony	mg/kg	10	80%	1.8350	2.60E+00	No	3.80E+00	No	Yes	8 20E+02	No	8.20E+01	No	No	<Tier I	No
Arsenic	mg/kg	10	100%	8.0950	1 00E+01	No	1.91E+01	No	Yes	3.00E+00	Yes	6.10E+01	No	No	<BK	No
Barium	mg/kg	10	100%	182.50	2.40E+02	No	3.63E+02	No	Yes	1.40E+05	No	1.40E+04	No	No	<Tier I	No
Benzene	ug/kg	10	10%	2 8321	3.00E+00	No	ND	--	No	1.50E+03	No	2.10E+03	No	No	<Tier I	No
Beryllium	mg/kg	10	100%	0.63	9.40E-01	No	1.51E+00	No	Yes	2.11E+03	No	4.08E+02	No	No	<Tier I	No
bis(2-Ethylhexyl)phthalate	ug/kg	10	10%	105.00	1 60E+02	No	3.22E+02	No	Yes	4.10E+05	No	4.10E+06	No	No	<Tier I	No
Cadmium	*mg/kg*	*10*	*100%*	*2.74*	*4.80E+00*	*No*	*8.65E+00*	*No*	*Yes*	*2.00E+03*	*No*	*2.00E+02*	*No*	*No*	*<Tier I*	*No*
Calcium	mg/kg	10	100%	5910.0000	8.70E+03	Yes	3.35E+04	No	Yes	NA	No	NA	No	No	EN	--
Carbon disulfide	ug/kg	10	10%	2.50	2.60E+00	No	ND	--	No	7.20E+05	No	9.00E+03	No	No	<Tier I	No
Chlorobenzene	ugkg	10	10%	3.0250	4.00E+00	No	ND	--	No	2.10E+05	No	1.30E+03	No	No	<Tier I	No
Chromium	mg/kg	10	100%	18.8500	4 90E+01	No	3.93E+01	Yes	No	4.20E+02	No	4.10E+03	No	No	<Tier I	No
Cobalt	mg/kg	10	100%	7.01	9.20E+00	No	1.55E+01	No	Yes	1.20E+05	No	1.20E+04	No	No	<Tier I	No
Copper	mg/kg	10	100%	131.80	2.30E+02	No	2.09E+02	Yes	No	8.20E+04	No	8.20E+03	No	No	<Tier I	No
Dicamba	ug/kg	10	40%	3.06	6.35E+00	No	ND	--	No	2.60E+07	No	2.60E+07	No	No	<Tier I	No
Dieldrin	ug/kg	10	30%	0.5763	1.50E+00	No	ND	--	No	4.00E+02	No	3 10E+03	No	No	<Tier I	No
Endosulfan sulfate	ug/kg	10	40%	0.2608	4 50E-01	No	ND	--	No	1 20E+07	No	1.20E+06	No	No	<Tier I	No
Endrin ketone	ug/kg	10	70%	0 27	4 90E-01	No	ND	--	No	6.10E+05	No	6.10E+04	No	No	<Tier I	No
Fluoranthene	ug/kg	10	10%	66.0000	6.60E+01	No	5.02E+02	No	Yes	8.20E+07	No	8.20E+07	No	No	<Tier I	No
Heptachlor epoxide	ug/kg	10	60%	0.2595	5.07E-01	No	ND	--	No	6.00E+02	No	2.70E+03	No	No	<Tier I	No
Iron	mg/kg	10	100%	15950	2.20E+04	Yes	3.80E+04	No	Yes	NA	No	NA	No	No	EN	--
Lead	mg/kg	10	100%	72 85	1.20E+02	No	1.85E+02	No	Yes	7.50E+02	No	7.50E+02	No	No	<Tier I	No
Magnesium	mg/kg	10	100%	4400.00	5.30E+03	Yes	1.72E+04	No	Yes	NA	No	NA	No	No	EN	--
Manganese	mg/kg	10	100%	365 00	5.50E+02	No	8.83E+02	No	Yes	9.10E+04	No	8.70E+03	No	No	<Tier I	No
MCPA	ug/kg	10	40%	2710.00	7 40E+03	No	1.45E+04	No	Yes	4.40E+05	No	4.40E+05	No	No	<Tier I	No
Mercury	mg/kg	10	100%	0.06	9.90E-02	No	1.77E-01	No	Yes	6.10E+02	No	6 10E+01	No	No	<Tier I	No
Methoxychlor	ug/kg	10	50%	2.06	2.90E+00	No	ND	--	No	1.00E+07	No	1.00E+06	No	No	<Tier I	No
Methylene chloride	ug/kg	10	20%	2.2000	2 40E+00	No	1.14E+01	No	Yes	2 40E+04	No	3 40E+04	No	No	<Tier I	No
Molybdenum	mg/kg	10	100%	0.50	8 60E-01	No	2.02E+00	No	Yes	1.00E+04	No	1.00E+04	No	No	<Tier I	No
Nickel	mg/kg	10	100%	19.45	2.50E+01	No	4.27E+01	No	Yes	2 10E+04	No	4.10E+03	No	No	<Tier I	No
Pentachlorophenol	*ug/kg*	*10*	*90%*	*295.93*	*4.82E+02*	*No*	*See notes*	*--*	*No*	*2.40E+04*	*No*	*5 20E+05*	*No*	*No*	*<Tier I*	*No*
Potassium	mg/kg	10	100%	2000.0000	2.80E+03	Yes	4.73E+03	No	Yes	NA	No	NA	No	No	EN	--
Selenium	mg/kg	10	20%	0.62	8.10E-01	No	ND	--	No	1.00E+04	No	1.00E+03	No	No	<Tier I	No
Silver	mg/kg	10	90%	0 3935	5.90E-01	No	1 35E+00	No	Yes	1.00E+04	No	1 00E+03	No	No	<Tier I	No
Thallium	mg/kg	10	40%	0 68	9.80E-01	No	ND	--	No	1.60E+02	No	1 60E+02	No	No	<Tier I	No
Toluene	ug/kg	10	20%	2.8417	3.20E+00	No	ND	--	No	6 50E+05	No	4 20E+04	No	No	<Tier I	No
Total PCBs	ug/kg	10	100%	101 2300	2 31E+02	No	See notes	--	No	1 00E+03	No	1 00E+03	No	No	<Tier I	No
Trichloroethene	ug/kg	10	30%	3.5200	6.20E+00	No	ND	--	No	8.90E+03	No	1.20E+04	No	No	<Tier I	No
Vanadium	mg/kg	10	100%	28.35	4 10E+01	No	6.90E+01	No	Yes	1 40E+04	No	1 40E+03	No	No	<Tier I	No
Zinc	mg/kg	10	100%	388.0000	1 40E+03	No	8.08E+02	Yes	No	6 10E+05	No	6 10E+04	No	No	<Tier I	No

Surface Soil - Industrial TACO Screen
Transect 2

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD TEQ	ug/kg	4	100%	5 87E-03	9.94E-03	No	1.24E-01	No	Yes	1.00E+00	No	1.00E+00	No	No	<Tier I	No
2-Hexanone	ug/kg	9	11%	4 80E+00	4 80E+00	No	3 30E+01	No	Yes	2 90E+06	No	2 90E+06	No	No	<Tier I	No
4,4'-DDD	ug/kg	9	11%	5 60E-01	5.60E-01	No	ND	--	No	2 40E+04	No	5 20E+05	No	No	<Tier I	No
4,4'-DDE	ug/kg	9	33%	3 80E-01	4.80E-01	No	1.61E+01	No	Yes	1 70E+04	No	3.70E+05	No	No	<Tier I	No
4,4'-DDT	ug/kg	9	56%	2 62E+00	1 40E+01	No	1 41E+01	No	Yes	1 70E+04	No	1 00E+05	No	No	<Tier I	No
Aluminum	mg/kg	9	100%	1 21E+04	1.80E+04	No	2 54E+04	No	Yes	1 00E+05	No	1 00E+05	No	No	<Tier I	No
Antimony	mg/kg	9	67%	1 21E+00	1.70E+00	No	3.80E+00	No	Yes	8 20E+02	No	8 20E+01	No	No	<Tier I	No
Arsenic	mg/kg	9	100%	7.94E+00	1 00E+01	No	1.91E+01	No	Yes	3 00E+00	Yes	6.10E+01	No	No	<BK	No
Barium	mg/kg	9	100%	1 92E+02	2 30E+02	No	3 63E+02	No	Yes	1 40E+05	No	1.40E+04	No	No	<Tier I	No
Benzo(a)anthracene	ug/kg	9	22%	5 90E+01	7 20E+01	No	2.40E+02	No	Yes	8 00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(a)pyrene	ug/kg	9	22%	5.64E+01	7 20E+01	No	1.87E+02	No	Yes	8.00E+02	No	1.70E+04	No	No	<Tier I	No
Benzo(b)fluoranthene	ug/kg	9	33%	4.87E+01	7.20E+01	No	1 79E+02	No	Yes	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(g,h,i)perylene	ug/kg	9	11%	4.00E+01	4.00E+01	No	1 27E+02	No	Yes	6 10E+07	No	6 10E+07	No	No	<Tier I	No
Benzo(k)fluoranthene	ug/kg	9	22%	5 60E+01	6 30E+01	No	2 08E+02	No	Yes	7.80E+04	No	1 70E+06	No	No	<Tier I	No
Beryllium	mg/kg	9	78%	6 82E-01	1 10E+00	No	1.51E+00	No	Yes	2 11E+03	No	4 08E+02	No	No	<Tier I	No
bis(2-Ethylhexyl)phthalate	ug/kg	9	33%	7 07E+01	9.40E+01	No	3 22E+02	No	Yes	4 10E+05	No	4 10E+06	No	No	<Tier I	No
Cadmium	mg/kg	9	100%	2 28E+00	2 80E+00	No	8 65E+00	No	Yes	2 00E+03	No	2 00E+02	No	No	<Tier I	No
Calcium	mg/kg	0	100%	8 18E+03	1 60E+04	Yes	3.35E+04	No	Yes	NA	No	NA	No	No	EN	--
Chromium	mg/kg	9	100%	2 13E+01	4 80E+01	No	3 93E+01	Yes	No	4 20E+02	No	4.10E+03	No	No	<Tier I	No
Chrysene	ug/kg	9	33%	6 23E+01	8 90E+01	No	2 73E+02	No	Yes	7 80E+05	No	1.70E+07	No	No	<Tier I	No
Cobalt	mg/kg	9	100%	7.76E+00	1 10E+01	No	1 55E+01	No	Yes	1 20E+05	No	1.20E+04	No	No	<Tier I	No
Copper	mg/kg	9	100%	9.02E+01	1.40E+02	No	2.09E+02	No	Yes	8 20E+04	No	8.20E+03	No	No	<Tier I	No
Dicamba	ug/kg	9	22%	2.20E+00	3.10E+00	No	ND	--	No	2 60E+07	No	2.60E+07	No	No	<Tier I	No
Dieldrin	ug/kg	9	11%	1 30E+00	1 30E+00	No	ND	--	No	4.00E+02	No	3.10E+03	No	No	<Tier I	No
Di-n-butylphthalate	ug/kg	9	11%	1.03E+02	1.20E+02	No	3.12E+02	No	Yes	2.30E+06	No	2.30E+06	No	No	<Tier I	No
Endosulfan sulfate	ug/kg	9	33%	3 30E-01	4 70E-01	No	ND	--	No	1.20E+07	No	1.20E+06	No	No	<Tier I	No
Endrin ketone	ug/kg	9	44%	5 95E-01	1 30E+00	No	ND	--	No	6 10E+05	No	6 10E+04	No	No	<Tier I	No
Fluoranthene	ug/kg	9	22%	1 08E+02	1 50E+02	No	5 02E+02	No	Yes	8 20E+07	No	8 20E+07	No	No	<Tier I	No
Gamma Chlordane	ug/kg	9	11%	2 00E-01	2 00E-01	No	ND	--	No	4 00E+03	No	1 20E+04	No	No	<Tier I	No
Heptachlor epoxide	ug/kg	9	22%	1.70E-01	1 90E-01	No	ND	--	No	6 00E+02	No	2 70E+03	No	No	<Tier I	No
Iron	mg/kg	9	100%	1 90E+04	2 50E+04	Yes	3 80E+04	No	Yes	NA	No	NA	No	No	EN	--
Lead	mg/kg	9	100%	6 47E+01	8 80E+01	No	1 85E+02	No	Yes	7 50E+02	No	7 50E+02	No	No	<Tier I	No
Magnesium	mg/kg	9	100%	5 16E+03	9 50E+03	Yes	1 72E+04	No	Yes	NA	No	NA	No	No	EN	--
Manganese	mg/kg	9	100%	5.56E+02	1 20E+03	No	8 83E+02	Yes	No	9 10E+04	No	8 70E+03	No	No	<Tier I	No
MCPA	ug/kg	9	22%	1.75E+03	5.50E+03	No	1 45E+04	No	Yes	4 40E+05	No	4 40E+05	No	No	<Tier I	No
MCPP	ug/kg	9	11%	1.91E+03	7.60E+03	No	9 97E+03	No	Yes	8 80E+05	No	8 80E+05	No	No	<Tier I	No
Mercury	mg/kg	9	100%	6 91E-02	9 40E-02	No	1.77E-01	No	Yes	6 10E+02	No	6.10E+01	No	No	<Tier I	No
Methoxychlor	ug/kg	9	22%	4.30E+00	7 30E+00	No	ND	--	No	1 00E+07	No	1 00E+06	No	No	<Tier I	No
Methylene chloride	ug/kg	9	11%	2.00E+00	2 00E+00	No	1 14E+01	No	Yes	2 40E+04	No	3 40E+04	No	No	<Tier I	No
Molybdenum	mg/kg	9	100%	7 67E-01	1 30E+00	No	2 02E+00	No	Yes	1 00E+04	No	1.00E+04	No	No	<Tier I	No
Nickel	mg/kg	9	100%	2 18E+01	2.70E+01	No	4.27E+01	No	Yes	2 10E+04	No	4.10E+03	No	No	<Tier I	No
Pentachlorophenol	ug/kg	9	44%	2 45E+02	2 51E+02	No	See notes	--	No	2 40E+04	No	5 20E+05	No	No	<Tier I	No
Phenanthrene	ug/kg	9	22%	5 65E+01	6 10E+01	No	3 35E+02	No	Yes	6 10E+08	No	6.10E+08	No	No	<Tier I	No
Potassium	mg/kg	9	100%	2.53E+03	3 80E+03	Yes	4 73E+03	No	Yes	NA	No	NA	No	No	EN	--
Pyrene	ug/kg	9	22%	1.03E+02	1 20E+02	No	4 35E+02	No	Yes	6 10E+07	No	6 10E+07	No	No	<Tier I	No
Selenium	mg/kg	9	33%	6.01E-01	1 00E+00	No	ND	--	No	1 00E+04	No	1.00E+03	No	No	<Tier I	No
Silver	mg/kg	9	89%	3 44E-01	4 80E-01	No	1 35E+00	No	Yes	1 00E+04	No	1.00E+03	No	No	<Tier I	No
Thallium	mg/kg	9	44%	7.21E-01	1.30E+00	No	ND	--	No	1 60E+02	No	1 60E+02	No	No	<Tier I	No
Toluene	ug/kg	9	11%	3 02E+00	3 40E+00	No	ND	-	No	6 50E+05	No	4 20E+04	No	No	<Tier I	No
Total PCBs	ug/kg	9	89%	6 68E+01	1 64E+02	No	See notes	--	No	1 00E+03	No	1.00E+03	No	No	<Tier I	No
Vanadium	mg/kg	9	100%	4.22E+01	1 20E+02	No	6 90E+01	Yes	No	1 40E+04	No	1.40E+03	No	No	<Tier I	No
Zinc	mg/kg	9	100%	2 46E+02	3 10E+02	No	8 08E+02	No	Yes	6 10E+05	No	6 10E+04	No	No	<Tier I	No

F-5

Surface Soil - Industrial TACO Screen
Transect 3

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD TEQ	ug/kg	4	100%	3.07E-03	3.66E-03	No	1.24E-01	No	Yes	1.00E+00	No	1.00E+00	No	No	<Tier I	No
2,4-DB	ug/kg	10	10%	8.89E+00	4.10E+01	No	ND	--	No	7.00E+06	No	7.00E+06	No	No	<Tier I	No
2-Butanone (MEK)	ug/kg	10	60%	2.77E+01	4.70E+01	No	ND	--	No	2.80E+07	No	2.80E+07	No	No	<Tier I	No
2-Hexanone	ug/kg	10	10%	6.90E+00	6.90E+00	No	3.30E+01	No	Yes	2.90E+06	No	2.90E+06	No	No	<Tier I	No
4,4'-DDE	ug/kg	10	50%	6.22E-01	1.70E+00	No	1.61E+01	No	Yes	1.70E+04	No	3.70E+05	No	No	<Tier I	No
4,4'-DDT	ug/kg	10	40%	1.21E+00	1.80E+00	No	1.41E+01	No	Yes	1.70E+04	No	1.00E+05	No	No	<Tier I	No
Acetone	ug/kg	10	60%	3.08E+02	6.70E+02	No	ND	--	No	1.00E+08	No	1.00E+08	No	No	<Tier I	No
Alpha Chlordane	ug/kg	10	20%	1.48E+00	5.80E+00	No	ND	--	No	4.00E+03	No	1.20E+04	No	No	<Tier I	No
Aluminum	mg/kg	10	100%	9.46E+03	1.70E+04	No	2.54E+04	No	Yes	1.00E+05	No	1.00E+05	No	No	<Tier I	No
Anthracene	ug/kg	10	20%	3.85E+01	5.10E+01	No	1.60E+02	No	Yes	6.10E+08	No	6.10E+08	No	No	<Tier I	No
Antimony	mg/kg	10	40%	1.20E+00	1.90E+00	No	3.80E+00	No	Yes	8.20E+02	No	8.20E+01	No	No	<Tier I	No
Arsenic	mg/kg	10	100%	6.64E+00	9.70E+00	No	1.91E+01	No	Yes	3.00E+00	Yes	6.10E+01	No	No	<BK	No
Barium	mg/kg	10	100%	1.65E+02	2.20E+02	No	3.63E+02	No	Yes	1.40E+05	No	1.40E+04	No	No	<Tier I	No
Benzene	ug/kg	10	10%	2.10E+00	2.10E+00	No	ND	--	No	1.50E+03	No	2.10E+03	No	No	<Tier I	No
Benzo(a)anthracene	ug/kg	10	50%	1.20E+02	4.80E+02	No	2.40E+02	Yes	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(a)pyrene	ug/kg	10	40%	1.37E+02	8.60E+02	No	1.87E+02	Yes	No	8.00E+02	Yes	1.70E+04	No	Yes	>DCind	No
Benzo(b)fluoranthene	ug/kg	10	60%	1.64E+02	9.70E+02	No	1.79E+02	Yes	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(g,h,i)perylene	ug/kg	10	50%	1.54E+02	8.30E+02	No	1.27E+02	Yes	No	6.10E+07	No	6.10E+07	No	No	<Tier I	No
Benzo(k)fluoranthene	ug/kg	10	40%	1.78E+02	1.00E+03	No	2.08E+02	Yes	No	7.80E+04	No	1.70E+06	No	No	<Tier I	No
Beryllium	mg/kg	10	90%	5.87E-01	1.10E+00	No	1.51E+00	No	Yes	2.11E+03	No	4.08E+02	No	No	<Tier I	No
beta-BHC	ug/kg	10	10%	3.38E-01	7.50E-01	No	ND	--	No	9.00E+02	No	2.10E+03	No	No	<Tier I	No
bis(2-Ethylhexyl)phthalate	ug/kg	10	40%	1.31E+02	4.30E+02	No	3.22E+02	Yes	No	4.10E+05	No	4.10E+06	No	No	<Tier I	No
Cadmium	mg/kg	10	100%	2.34E+00	3.80E+00	No	8.65E+00	No	Yes	2.00E+03	No	2.00E+02	No	No	<Tier I	No
Calcium	mg/kg	10	100%	3.27E+04	2.50E+05	Yes	3.35E+04	Yes	Yes	NA	No	NA	No	No	EN	--
Carbazole	ug/kg	10	10%	8.80E+01	8.80E+01	No	6.40E+01	Yes	No	2.90E+05	No	6.20E+06	No	No	<Tier I	No
Chromium	mg/kg	10	100%	1.59E+01	2.30E+01	No	3.93E+01	No	Yes	4.20E+02	No	4.10E+03	No	No	<Tier I	No
Chrysene	ug/kg	10	70%	1.63E+02	9.80E+02	No	2.73E+02	Yes	No	7.80E+05	No	1.70E+07	No	No	<Tier I	No
Cobalt	mg/kg	10	100%	6.50E+00	1.00E+01	No	1.55E+01	No	Yes	1.20E+05	No	1.20E+04	No	No	<Tier I	No
Copper	mg/kg	10	100%	6.56E+01	7.90E+01	No	2.09E+02	No	Yes	8.20E+04	No	8.20E+03	No	No	<Tier I	No
Dibenzo(a,h)anthracene	ug/kg	10	10%	7.15E+01	2.50E+02	No	ND	--	No	8.00E+02	No	1.70E+04	No	No	<Tier I	No
Dicamba	ug/kg	10	20%	8.80E+00	2.30E+01	No	ND	--	No	2.60E+07	No	2.60E+07	No	No	<Tier I	No
Dieldrin	ug/kg	10	40%	9.28E-01	1.08E+00	No	ND	--	No	4.00E+02	No	3.10E+03	No	No	<Tier I	No
Endrin ketone	ug/kg	10	20%	4.60E-01	7.50E-01	No	ND	--	No	6.10E+05	No	6.10E+04	No	No	<Tier I	No
Fluoranthene	ug/kg	10	60%	2.49E+02	1.50E+03	No	5.02E+02	Yes	No	8.20E+07	No	8.20E+07	No	No	<Tier I	No
Gamma Chlordane	ug/kg	10	30%	1.40E+00	5.10E+00	No	ND	--	No	4.00E+03	No	1.20E+04	No	No	<Tier I	No
Indeno(1,2,3-cd)pyrene	ug/kg	10	10%	1.59E+02	6.90E+02	No	ND	--	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Iron	mg/kg	10	100%	1.45E+04	2.20E+04	Yes	3.80E+04	No	Yes	NA	No	NA	No	No	EN	--
Lead	mg/kg	10	100%	5.45E+01	9.00E+01	No	1.85E+02	No	Yes	7.50E+02	No	7.50E+02	No	No	<Tier I	No
Magnesium	mg/kg	10	100%	6.25E+03	1.80E+04	Yes	1.72E+04	Yes	Yes	NA	No	NA	No	No	EN	--
Manganese	mg/kg	10	100%	3.79E+02	6.10E+02	No	8.83E+02	No	Yes	9.10E+04	No	8.70E+03	No	No	<Tier I	No
MCPA	ug/kg	10	20%	1.54E+03	4.00E+03	No	1.45E+04	No	Yes	4.40E+05	No	4.40E+05	No	No	<Tier I	No
MCPP	ug/kg	10	20%	2.25E+03	7.70E+03	No	9.97E+03	No	Yes	8.80E+05	No	8.80E+05	No	No	<Tier I	No
Mercury	mg/kg	10	100%	6.27E-02	9.30E-02	No	1.77E-01	No	Yes	6.10E+02	No	6.10E+01	No	No	<Tier I	No
Methoxychlor	ug/kg	10	10%	2.60E+00	2.60E+00	No	ND	--	No	1.00E+07	No	1.00E+06	No	No	<Tier I	No
Molybdenum	mg/kg	10	100%	7.38E-01	1.40E+00	No	2.02E+00	No	Yes	1.00E+04	No	1.00E+04	No	No	<Tier I	No
Nickel	mg/kg	10	100%	1.86E+01	2.60E+01	No	4.27E+01	No	Yes	2.10E+04	No	4.10E+03	No	No	<Tier I	No
Pentachlorophenol	ug/kg	10	20%	2.97E+02	7.40E+02	No	See notes	--	No	2.40E+04	No	5.20E+05	No	No	<Tier I	No
Phenanthrene	ug/kg	10	40%	1.33E+02	5.30E+02	No	3.35E+02	Yes	No	6.10E+08	No	6.10E+08	No	No	<Tier I	No
Potassium	mg/kg	10	100%	2.18E+03	3.70E+03	Yes	4.73E+03	No	Yes	NA	No	NA	No	No	EN	--

F-6

Surface Soil - Industrial TACO Screen
Transect 3

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Pyrene	ug/kg	10	30%	2.39E+02	1.40E+03	No	4.35E+02	Yes	No	6.10E+07	No	6.10E+07	No	No	<Tier I	No
Selenium	mg/kg	10	20%	8.30E-01	3.20E+00	No	ND	--	No	1.00E+04	No	1.00E+03	No	No	<Tier I	No
Silver	mg/kg	10	40%	2.98E-01	3.80E-01	No	1.35E+00	No	Yes	1.00E+04	No	1.00E+03	No	No	<Tier I	No
Thallium	mg/kg	10	30%	6.93E-01	1.40E+00	No	ND	--	No	1.60E+02	No	1.60E+02	No	No	<Tier I	No
Toluene	ug/kg	10	30%	3.17E+00	5.30E+00	No	ND	--	No	6.50E+05	No	4.20E+04	No	No	<Tier I	No
Total PCBs	ug/kg	10	90%	6.29E+01	1.16E+02	No	See notes	--	No	1.00E+03	No	1.00E+03	No	No	<Tier I	No
Vanadium	mg/kg	10	100%	2.68E+01	4.20E+01	No	6.90E+01	No	Yes	1.40E+04	No	1.40E+03	No	No	<Tier I	No
Zinc	mg/kg	10	100%	2.70E+02	4.60E+02	No	8.08E+02	No	Yes	6.10E+05	No	6.10E+04	No	No	<Tier I	No

F-7

Surface Soil - Industrial TACO Screen
Transect 4

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD TEQ	ug/kg	5	100%	4.71E-03	7.42E-03	No	1 24E-01	No	Yes	1.00E+00	No	1 00E+00	No	No	<Tier I	No
2,4-DB	ug/kg	10	10%	7.68E+00	3.50E+01	No	ND	--	No	7.00E+06	No	7.00E+06	No	No	<Tier I	No
2-Butanone (MEK)	ug/kg	10	10%	1.50E+01	2.45E+01	No	ND	--	No	2.80E+07	No	2.80E+07	No	No	<Tier I	No
2-Methylnaphthalene	ug/kg	10	20%	6.68E+01	7 20E+01	No	ND	--	No	8.20E+07	No	8.20E+06	No	No	<Tier I	No
4,4'-DDE	ug/kg	10	40%	1.08E+00	1.50E+00	No	1 61E+01	No	Yes	1.70E+04	No	3.70E+05	No	No	<Tier I	No
4,4'-DDT	ug/kg	10	50%	1.74E+00	3.00E+00	No	1.41E+01	No	Yes	1.70E+04	No	1.00E+05	No	No	<Tier I	No
Acenaphthene	ug/kg	10	50%	2.11E+02	1.20E+03	No	ND	--	No	1.20E+08	No	1.20E+08	No	No	<Tier I	No
Acenaphthylene	ug/kg	10	30%	4.93E+01	7.50E+01	No	ND	--	No	1.20E+08	No	1.20E+08	No	No	<Tier I	No
Acetone	ug/kg	10	20%	9.68E+01	4.60E+02	No	ND	--	No	1.00E+08	No	1.00E+08	No	No	<Tier I	No
Alpha Chlordane	ug/kg	10	40%	1.32E+00	3.10E+00	No	ND	--	No	4.00E+03	No	1.20E+04	No	No	<Tier I	No
Aluminum	mg/kg	10	100%	9.40E+03	1.40E+04	No	2.54E+04	No	Yes	1.00E+05	No	1.00E+05	No	No	<Tier I	No
Anthracene	ug/kg	10	60%	3.65E+02	2.30E+03	No	1.60E+02	Yes	No	6.10E+08	No	6.10E+08	No	No	<Tier I	No
Antimony	mg/kg	10	10%	6.50E-01	6.50E-01	No	3 80E+00	No	Yes	8.20E+02	No	8.20E+01	No	No	<Tier I	No
Arsenic	mg/kg	10	100%	6.76E+00	1.00E+01	No	1.91E+01	No	Yes	3.00E+00	Yes	6.10E+01	No	No	<BK	No
Barium	mg/kg	10	100%	2 65E+02	1.20E+03	No	3.63E+02	Yes	No	1.40E+05	No	1.40E+04	No	No	<Tier I	No
Benzo(a)anthracene	ug/kg	10	80%	7.03E+02	4.30E+03	No	2.40E+02	Yes	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(a)pyrene	ug/kg	10	50%	5.91E+02	3.50E+03	No	1.87E+02	Yes	No	8.00E+02	Yes	1.70E+04	No	Yes	>DCind	No
Benzo(b)fluoranthene	ug/kg	10	50%	5.98E+02	3.50E+03	No	1.79E+02	Yes	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(g,h,i)perylene	ug/kg	10	40%	3.93E+02	2.20E+03	No	1.27E+02	Yes	No	6.10E+07	No	6.10E+07	No	No	<Tier I	No
Benzo(k)fluoranthene	ug/kg	10	50%	5.42E+02	3.30E+03	No	2.08E+02	Yes	No	7.80E+04	No	1.70E+06	No	No	<Tier I	No
Beryllium	mg/kg	10	100%	5.83E-01	8.60E-01	No	1 51E+00	No	Yes	2.11E+03	No	4.08E+02	No	No	<Tier I	No
beta-BHC	ug/kg	10	40%	4.41E-01	1.30E+00	No	ND	--	No	9.00E+02	No	2.10E+03	No	No	<Tier I	No
bis(2-Ethylhexyl)phthalate	ug/kg	10	10%	6.60E+01	6.60E+01	No	3.22E+02	No	Yes	4.10E+05	No	4.10E+06	No	No	<Tier I	No
Cadmium	mg/kg	10	100%	1.62E+00	3 20E+00	No	8 65E+00	No	Yes	2.00E+03	No	2 00E+02	No	No	<Tier I	No
Calcium	mg/kg	10	100%	5.13E+04	1.50E+05	Yes	3 35E+04	Yes	Yes	NA	No	NA	No	No	EN	--
Carbazole	ug/kg	10	50%	1.88E+02	1.00E+03	No	6.40E+01	Yes	No	2.90E+05	No	6 20E+06	No	No	<Tier I	No
Chromium	mg/kg	10	100%	1.76E+01	2.90E+01	No	3.93E+01	No	Yes	4.20E+02	No	4.10E+03	No	No	<Tier I	No
Chrysene	ug/kg	10	90%	7.10E+02	4 40E+03	No	2.73E+02	Yes	No	7 80E+05	No	1.70E+07	No	No	<Tier I	No
Cobalt	mg/kg	10	100%	6.40E+00	1.00E+01	No	1 55E+01	No	Yes	1.20E+05	No	1 20E+04	No	No	<Tier I	No
Copper	mg/kg	10	100%	6.51E+01	1.80E+02	No	2.09E+02	No	Yes	8.20E+04	No	8.20E+03	No	No	<Tier I	No
delta-BHC	ug/kg	10	40%	1.64E-01	2.40E-01	No	ND	--	No	9.00E+02	No	2.10E+03	No	No	<Tier I	No
Dibenzo(a,h)anthracene	ug/kg	10	10%	1 31E+02	8 10E+02	No	ND	--	No	8.00E+02	Yes	1.70E+04	No	Yes	>DCind	No
Dibenzofuran	ug/kg	10	30%	1.63E+02	7.70E+02	No	ND	--	No	5.10E+06	No	5.10E+06	No	No	<Tier I	No
Dicamba	ug/kg	10	20%	1.63E+00	1.75E+00	No	ND	--	No	2.60E+07	No	2 60E+07	No	No	<Tier I	No
Dieldrin	ug/kg	10	60%	2.84E+00	1.00E+01	No	ND	--	No	4.00E+02	No	3.10E+03	No	No	<Tier I	No
Endosulfan sulfate	ug/kg	10	20%	1.20E-01	1.40E-01	No	ND	--	No	1.20E+07	No	1 20E+06	No	No	<Tier I	No
Endrin ketone	ug/kg	10	40%	1.90E+00	4.00E+00	No	ND	--	No	6 10E+05	No	6.10E+04	No	No	<Tier I	No
Fluoranthene	*ug/kg*	*10*	*90%*	*1.58E+03*	*1.00E+04*	*No*	*5.02E+02*	*Yes*	*No*	*8.20E+07*	*No*	*8.20E+07*	*No*	*No*	*<Tier I*	*No*
Fluorene	ug/kg	10	40%	2.33E+02	1.40E+03	No	ND	--	No	8.20E+07	No	8.20E+07	No	No	<Tier I	No
Gamma Chlordane	ug/kg	10	40%	1 83E+00	6.60E+00	No	ND	--	No	4.00E+03	No	1 20E+04	No	No	<Tier I	No
Heptachlor	ug/kg	10	20%	4.90E-01	6.40E-01	No	ND	--	No	1.00E+03	No	1 60E+04	No	No	<Tier I	No
Heptachlor epoxide	ug/kg	10	30%	1.01E+00	2.30E+00	No	ND	--	No	6.00E+02	No	2.70E+03	No	No	<Tier I	No
Indeno(1,2,3-cd)pyrene	ug/kg	10	40%	3.55E+02	2.00E+03	No	ND	--	No	8.00E+03	No	1 70E+05	No	No	<Tier I	No
Iron	mg/kg	10	100%	1.54E+04	2.10E+04	Yes	3 80E+04	No	Yes	NA	No	NA	No	No	EN	--
Lead	mg/kg	10	100%	1.00E+02	2.60E+02	No	1.85E+02	Yes	No	7 50E+02	No	7.50E+02	No	No	<Tier I	No
Magnesium	mg/kg	10	100%	7.03E+03	2 10E+04	Yes	1 72E+04	Yes	Yes	NA	No	NA	No	No	EN	--
Manganese	mg/kg	10	100%	4.14E+02	6.10E+02	No	8.83E+02	No	Yes	9.10E+04	No	8 70E+03	No	No	<Tier I	No
MCPA	ug/kg	10	30%	1 57E+03	3.70E+03	No	1.45E+04	No	Yes	4.40E+05	No	4 40E+05	No	No	<Tier I	No
Mercury	mg/kg	10	100%	1 22E-01	5.70E-01	No	1.77E-01	Yes	No	6.10E+02	No	6.10E+01	No	No	<Tier I	No

Surface Soil - Industrial TACO Screen
Transect 4

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Methoxychlor	ug/kg	10	50%	6.20E+00	9.70E+00	No	ND	--	No	1.00E+07	No	1.00E+06	No	No	<Tier I	No
Molybdenum	mg/kg	10	100%	1.02E+00	2.30E+00	No	2.02E+00	Yes	No	1.00E+04	No	1.00E+04	No	No	<Tier I	No
Naphthalene	ug/kg	10	20%	6.00E+01	7.90E+01	No	ND	--	No	8.20E+07	No	8 20E+06	No	No	<Tier I	No
Nickel	mg/kg	10	100%	1.82E+01	2.40E+01	No	4.27E+01	No	Yes	2.10E+04	No	4.10E+03	No	No	<Tier I	No
Pentachlorophenol	ug/kg	10	100%	2.89E+02	5.03E+02	No	See notes	--	No	2.40E+04	No	5.20E+05	No	No	<Tier I	No
Phenanthrene	ug/kg	10	70%	1.35E+03	9.20E+03	No	3 35E+02	Yes	No	6.10E+08	No	6 10E+08	No	No	<Tier I	No
Potassium	mg/kg	10	100%	1.84E+03	2.00E+03	Yes	4.73E+03	No	Yes	NA	No	NA	No	No	EN	--
Pyrene	ug/kg	10	70%	1.35E+03	8.50E+03	No	4.35E+02	Yes	No	6.10E+07	No	6.10E+07	No	No	<Tier I	No
Selenium	mg/kg	10	10%	5.79E-01	8.80E-01	No	ND	--	No	1.00E+04	No	1.00E+03	No	No	<Tier I	No
Silver	mg/kg	10	30%	3 25E-01	4 45E-01	No	1.35E+00	No	Yes	1 00F+04	No	1.00E+03	No	No	<Tier I	No
Thallium	mg/kg	10	30%	6.64E-01	1.10E+00	No	ND	--	No	1.60E+02	No	1.60E+02	No	No	<Tier I	No
Toluene	ug/kg	10	10%	2 86E+00	4.50E+00	No	ND	--	No	6.50E+05	No	4 20E+04	No	No	<Tier I	No
Total PCBs	ug/kg	10	50%	3.21E+01	5.80E+01	No	See notes	--	No	1.00E+03	No	1.00E+03	No	No	<Tier I	No
Vanadium	mg/kg	10	100%	2.58E+01	3.50E+01	No	6.90E+01	No	Yes	1.40E+04	No	1.40E+03	No	No	<Tier I	No
Zinc	mg/kg	10	100%	2.22E+02	5.50E+02	No	8.08E+02	No	Yes	6.10E+05	No	6.10E+04	No	No	<Tier I	No

F-9

Surface Soil - Industrial TACO Screen
Transect 5

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD TEQ	ug/kg	4	100%	7.87E-03	2.18E-02	No	1.24E-01	No	Yes	1.00E+00	No	1.00E+00	No	No	<Tier I	No
2,4-DB	ug/kg	9	22%	6.15E+00	2.30E+01	No	ND	--	No	7.00E+06	No	7.00E+06	No	No	<Tier I	No
2-Butanone (MEK)	ug/kg	9	56%	1.83E+01	3.40E+01	No	ND	--	No	2.80E+07	No	2.80E+07	No	No	<Tier I	No
4,4'-DDD	ug/kg	9	11%	6.73E+00	3.60E+01	No	ND	--	No	2.40E+04	No	5.20E+05	No	No	<Tier I	No
4,4'-DDE	ug/kg	9	33%	3.15E+00	8.30E+00	No	1.61E+01	No	Yes	1.70E+04	No	3.70E+05	No	No	<Tier I	No
4,4'-DDT	ug/kg	9	33%	1.67E+01	1.10E+02	No	1.41E+01	Yes	No	1.70E+04	No	1.00E+05	No	No	<Tier I	No
Acenaphthylene	ug/kg	9	11%	3.40E+01	3.40E+01	No	ND	--	No	1.20E+08	No	1.20E+08	No	No	<Tier I	No
Acetone	ug/kg	9	56%	1.37E+02	4.60E+02	No	ND	--	No	1.00E+08	No	1.00E+08	No	No	<Tier I	No
Aldrin	ug/kg	9	11%	3.96E+00	2.30E+01	No	ND	--	No	3.00E+02	No	6.10E+03	No	No	<Tier I	No
Alpha Chlordane	ug/kg	9	33%	6.12E+00	5.40E+01	No	ND	--	No	4.00E+03	No	1.20E+04	No	No	<Tier I	No
Aluminum	mg/kg	9	100%	8.37E+03	1.10E+04	No	2.54E+04	No	Yes	1.00E+05	No	1.00E+05	No	No	<Tier I	No
Anthracene	ug/kg	9	11%	6.90E+01	8.90E+01	No	1.60E+02	No	Yes	6.10E+08	No	6.10E+08	No	No	<Tier I	No
Antimony	mg/kg	9	33%	7.18E-01	9.05E-01	No	3.80E+00	No	Yes	8.20E+02	No	8.20E+01	No	No	<Tier I	No
Arsenic	mg/kg	9	100%	6.33E+00	7.60E+00	No	1.91E+01	No	Yes	3.00E+00	Yes	6.10E+01	No	No	<BK	No
Barium	mg/kg	9	100%	1.74E+02	1.90E+02	No	3.63E+02	No	Yes	1.40E+05	No	1.40E+04	No	No	<Tier I	No
Benzene	ug/kg	9	11%	1.80E+00	1.80E+00	No	ND	--	No	1.50E+03	No	2.10E+03	No	No	<Tier I	No
Benzo(a)anthracene	ug/kg	9	67%	1.21E+02	4.60E+02	No	2.40E+02	Yes	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(a)pyrene	ug/kg	9	44%	1.38E+02	6.00E+02	No	1.87E+02	Yes	No	8.00E+02	No	1.70E+04	No	No	<Tier I	No
Benzo(b)fluoranthene	ug/kg	9	67%	1.78E+02	7.80E+02	No	1.79E+02	Yes	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(g,h,i)perylene	ug/kg	9	44%	1.58E+02	4.30E+02	No	1.27E+02	Yes	No	6.10E+07	No	6.10E+07	No	No	<Tier I	No
Benzo(k)fluoranthene	ug/kg	9	44%	1.59E+02	6.00E+02	No	2.08E+02	Yes	No	7.80E+04	No	1.70E+06	No	No	<Tier I	No
Beryllium	mg/kg	9	100%	5.29E-01	6.60E-01	No	1.51E+00	No	Yes	2.11E+03	No	4.08E+02	No	No	<Tier I	No
beta-BHC	ug/kg	9	11%	1.00E-01	1.00E-01	No	ND	--	No	9.00E+02	No	2.10E+03	No	No	<Tier I	No
bis(2-Ethylhexyl)phthalate	ug/kg	9	44%	1.06E+02	1.80E+02	No	3.22E+02	No	Yes	4.10E+05	No	4.10E+06	No	No	<Tier I	No
Butylbenzylphthalate	ug/kg	9	11%	1.22E+02	3.40E+02	No	ND	--	No	9.30E+05	No	9.30E+05	No	No	<Tier I	No
Cadmium	mg/kg	9	100%	3.42E+00	8.40E+00	No	8.65E+00	No	Yes	2.00E+03	No	2.00E+02	No	No	<Tier I	No
Calcium	mg/kg	9	100%	9.93E+03	2.05E+04	Yes	3.35E+04	No	Yes	NA	No	NA	No	No	EN	--
Carbazole	ug/kg	9	11%	7.10E+01	7.10E+01	No	6.40E+01	Yes	No	2.90E+05	No	6.20E+06	No	No	<Tier I	No
Chromium	mg/kg	9	100%	1.46E+01	1.85E+01	No	3.93E+01	No	Yes	4.20E+02	No	4.10E+03	No	No	<Tier I	No
Chrysene	ug/kg	9	67%	1.70E+02	7.10E+02	No	2.73E+02	Yes	No	7.80E+05	No	1.70E+07	No	No	<Tier I	No
Cobalt	mg/kg	9	100%	5.99E+00	6.90E+00	No	1.55E+01	No	Yes	1.20E+05	No	1.20E+04	No	No	<Tier I	No
Copper	mg/kg	9	100%	5.42E+01	8.45E+01	No	2.09E+02	No	Yes	8.20E+04	No	8.20E+03	No	No	<Tier I	No
Dibenzo(a,h)anthracene	ug/kg	9	44%	9.86E+01	3.20E+02	No	ND	--	No	8.00E+02	No	1.70E+04	No	No	<Tier I	No
Dicamba	ug/kg	9	22%	2.10E+00	2.90E+00	No	ND	--	No	2.60E+07	No	2.60E+07	No	No	<Tier I	No
Dieldrin	ug/kg	9	22%	1.58E+01	1.20E+02	No	ND	--	No	4.00E+02	No	3.10E+03	No	No	<Tier I	No
Diethylphthalate	ug/kg	9	11%	3.90E+01	3.90E+01	No	1.87E+02	No	Yes	2.00E+06	No	2.00E+06	No	No	<Tier I	No
Di-n-butylphthalate	ug/kg	9	22%	3.35E+01	3.50E+01	No	3.12E+02	No	Yes	2.30E+06	No	2.30E+06	No	No	<Tier I	No
Endrin	ug/kg	9	11%	2.62E+00	6.10E+00	No	ND	--	No	6.10E+05	No	6.10E+04	No	No	<Tier I	No
Endrin aldehyde	ug/kg	9	22%	2.29E+00	5.06E+00	No	ND	--	No	6.10E+05	No	6.10E+04	No	No	<Tier I	No
Endrin ketone	ug/kg	9	11%	2.47E+00	4.95E+00	No	ND	--	No	6.10E+05	No	6.10E+04	No	No	<Tier I	No
Fluoranthene	ug/kg	9	56%	2.43E+02	1.10E+03	No	5.02E+02	Yes	No	8.20E+07	No	8.20E+07	No	No	<Tier I	No
Gamma Chlordane	ug/kg	9	22%	1.77E+01	7.80E+01	No	ND	--	No	4.00E+03	No	1.20E+04	No	No	<Tier I	No
Heptachlor	ug/kg	9	11%	1.15E+01	9.10E+01	No	ND	--	No	1.00E+03	No	1.60E+04	No	No	<Tier I	No
Heptachlor epoxide	ug/kg	9	22%	4.94E+00	3.00E+01	No	ND	--	No	6.00E+02	No	2.70E+03	No	No	<Tier I	No
Indeno(1,2,3-cd)pyrene	ug/kg	9	56%	1.71E+02	4.50E+02	No	ND	--	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Iron	mg/kg	9	100%	1.39E+04	1.60E+04	Yes	3.80E+04	No	Yes	NA	No	NA	No	No	EN	--
Lead	mg/kg	9	100%	8.03E+01	1.70E+02	No	1.85E+02	No	Yes	7.50E+02	No	7.50E+02	No	No	<Tier I	No
Magnesium	mg/kg	9	100%	4.13E+03	5.00E+03	Yes	1.72E+04	No	Yes	NA	No	NA	No	No	EN	--
Manganese	mg/kg	9	100%	3.48E+02	4.00E+02	No	8.83E+02	No	Yes	9.10E+04	No	8.70E+03	No	No	<Tier I	No

Surface Soil - Industrial TACO Screen
Transect 5

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
MCPA	ug/kg	9	22%	1.58E+03	4.40E+03	No	1.45E+04	No	Yes	4.40E+05	No	4 40E+05	No	No	<Tier I	No
MCPP	ug/kg	9	67%	2.95E+03	6.80E+03	No	9.97E+03	No	Yes	8.80E+05	No	8 80E+05	No	No	<Tier I	No
Mercury	mg/kg	9	100%	6.97E-02	1.15E-01	No	1.77E-01	No	Yes	6.10E+02	No	6 10E+01	No	No	<Tier I	No
Methoxychlor	ug/kg	9	33%	1.47E+01	3.80E+01	No	ND	--	No	1.00E+07	No	1.00E+06	No	No	<Tier I	No
Molybdenum	mg/kg	9	100%	4.64E-01	7.80E-01	No	2.02E+00	No	Yes	1.00E+04	No	1.00E+04	No	No	<Tier I	No
Nickel	mg/kg	9	100%	1.68E+01	1.90E+01	No	4.27E+01	No	Yes	2.10E+04	No	4 10E+03	No	No	<Tier I	No
Pentachlorophenol	ug/kg	9	33%	2.34E+02	2.41E+02	No	See notes	--	No	2.40E+04	No	5.20E+05	No	No	<Tier I	No
Phenanthrene	ug/kg	9	67%	1.01E+02	3.60E+02	No	3.35E+02	Yes	No	6.10E+08	No	6.10E+08	No	No	<Tier I	No
Potassium	mg/kg	9	100%	1.76E+03	2.40E+03	Yes	4.73E+03	No	Yes	NA	No	NA	No	No	EN	--
Pyrene	ug/kg	9	56%	1.99E+02	8.10E+02	No	4 35E+02	Yes	No	6.10E+07	No	6 10E+07	No	No	<Tier I	No
Selenium	mg/kg	9	11%	4.60E-01	4.60E-01	No	ND	--	No	1.00E+04	No	1 00E+03	No	No	<Tier I	No
Silver	mg/kg	9	33%	5.01E-01	6.00E-01	No	1.35E+00	No	Yes	1.00E+04	No	1 00E+03	No	No	<Tier I	No
Toluene	ug/kg	9	11%	2.70E+00	2.80E+00	No	ND	--	No	6.50E+05	No	4.20E+04	No	No	<Tier I	No
Total PCBs	ug/kg	9	78%	6.67E+01	1.65E+02	No	See notes	--	No	1.00E+03	No	1.00E+03	No	No	<Tier I	No
Vanadium	mg/kg	9	100%	2.43E+01	2.90E+01	No	6 90E+01	No	Yes	1.40E+04	No	1 40E+03	No	No	<Tier I	No
Zinc	mg/kg	9	100%	3.74E+02	9.80E+02	No	8.08E+02	Yes	No	6.10E+05	No	6 10E+04	No	No	<Tier I	No

Surface Soil - Industrial TACO Screen
Transect 6

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD TEQ	ug/kg	4	100%	6.37E-03	1.32E-02	No	1.24E-01	No	Yes	1.00E+00	No	1.00E+00	No	No	<Tier I	No
4,4'-DDD	ug/kg	8	25%	2.93E+00	6.40E+00	No	ND	--	No	2.40E+04	No	5.20E+05	No	No	<Tier I	No
4,4'-DDE	ug/kg	8	75%	5.35E+00	1.80E+01	No	1.61E+01	Yes	No	1.70E+04	No	3.70E+05	No	No	<Tier I	No
4,4'-DDT	ug/kg	8	38%	3.56E+01	1.40E+02	No	1.41E+01	Yes	No	1.70E+04	No	1.00E+05	No	No	<Tier I	No
Acenaphthene	ug/kg	8	25%	1.26E+02	4.20E+02	No	ND	--	No	1.20E+08	No	1.20E+08	No	No	<Tier I	No
Acetone	ug/kg	8	38%	1.05E+02	4.20E+02	No	ND	--	No	1.00E+08	No	1.00E+08	No	No	<Tier I	No
Alpha Chlordane	ug/kg	8	25%	4.52E+00	1.70E+01	No	ND	--	No	4.00E+03	No	1.20E+04	No	No	<Tier I	No
alpha-BHC	ug/kg	8	13%	2.20E-01	2.20E-01	No	ND	--	No	9.00E+02	No	2.10E+03	No	No	<Tier I	No
Aluminum	mg/kg	8	100%	7.98E+03	9.70E+03	No	2.54E+04	No	Yes	1.00E+05	No	1.00E+05	No	No	<Tier I	No
Anthracene	ug/kg	8	38%	2.43E+02	1.40E+03	No	1.60E+02	Yes	No	6.10E+08	No	6.10E+08	No	No	<Tier I	No
Antimony	mg/kg	8	50%	6.88E-01	7.70E-01	No	3.80E+00	No	Yes	8.20E+02	No	8.20E+01	No	No	<Tier I	No
Arsenic	mg/kg	8	100%	6.01E+00	9.20E+00	No	1.91E+01	No	Yes	3.00E+00	Yes	6.10E+01	No	No	<BK	No
Barium	mg/kg	8	100%	1.50E+02	2.00E+02	No	3.63E+02	No	Yes	1.40E+05	No	1.40E+04	No	No	<Tier I	No
Benzo(a)anthracene	ug/kg	8	88%	6.06E+02	4.20E+03	No	2.40E+02	Yes	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(a)pyrene	ug/kg	8	25%	5.04E+02	3.60E+03	No	1.87E+02	Yes	No	8.00E+02	Yes	1.70E+04	No	Yes	>DCInd	No
Benzo(b)fluoranthene	ug/kg	8	88%	6.34E+02	4.40E+03	No	1.79E+02	Yes	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(g,h,i)perylene	ug/kg	8	13%	2.48E+02	1.30E+03	No	1.27E+02	Yes	No	6.10E+07	No	6.10E+07	No	No	<Tier I	No
Benzo(k)fluoranthene	ug/kg	8	25%	5.03E+02	3.40E+03	No	2.08E+02	Yes	No	7.80E+04	No	1.70E+06	No	No	<Tier I	No
Beryllium	mg/kg	8	88%	4.90E-01	8.60E-01	No	1.51E+00	No	Yes	2.11E+03	No	4.08E+02	No	No	<Tier I	No
beta-BHC	ug/kg	8	13%	1.34E+00	3.80E+00	No	ND	--	No	9.00E+02	No	2.10E+03	No	No	<Tier I	No
bis(2-Ethylhexyl)phthalate	ug/kg	8	25%	1.19E+02	3.60E+02	No	3.22E+02	Yes	No	4.10E+05	No	4.10E+06	No	No	<Tier I	No
Butylbenzylphthalate	ug/kg	8	13%	5.70E+01	5.70E+01	No	ND	--	No	9.30E+05	No	9.30E+05	No	No	<Tier I	No
Cadmium	mg/kg	8	100%	1.50E+00	4.00E+00	No	8.65E+00	No	Yes	2.00E+03	No	2.00E+02	No	No	<Tier I	No
Calcium	mg/kg	8	100%	6.26E+04	1.50E+05	Yes	3.35E+04	Yes	Yes	NA	No	NA	No	No	EN	--
Carbazole	ug/kg	8	13%	1.91E+02	8.60E+02	No	6.40E+01	Yes	No	2.90E+05	No	6.20E+06	No	No	<Tier I	No
Chromium	mg/kg	8	100%	1.44E+01	1.80E+01	No	3.93E+01	No	Yes	4.20E+02	No	4.10E+03	No	No	<Tier I	No
Chrysene	ug/kg	8	88%	7.12E+02	4.90E+03	No	2.73E+02	Yes	No	7.80E+05	No	1.70E+07	No	No	<Tier I	No
Cobalt	mg/kg	8	100%	5.96E+00	9.20E+00	No	1.55E+01	No	Yes	1.20E+05	No	1.20E+04	No	No	<Tier I	No
Copper	mg/kg	8	100%	2.93E+01	5.60E+01	No	2.09E+02	No	Yes	8.20E+04	No	8.20E+03	No	No	<Tier I	No
delta-BHC	ug/kg	8	13%	1.20E-01	1.20E-01	No	ND	--	No	9.00E+02	No	2.10E+03	No	No	<Tier I	No
Dibenzo(a,h)anthracene	ug/kg	8	38%	1.18E+02	6.00E+02	No	ND	--	No	8.00E+02	No	1.70E+04	No	No	<Tier I	No
Dibenzofuran	ug/kg	8	13%	1.12E+02	2.30E+02	No	ND	--	No	5.10E+06	No	5.10E+06	No	No	<Tier I	No
Dicamba	ug/kg	8	25%	2.35E+00	3.00E+00	No	ND	--	No	2.60E+07	No	2.60E+07	No	No	<Tier I	No
Dieldrin	ug/kg	8	13%	1.80E+00	1.80E+00	No	ND	--	No	4.00E+02	No	3.10E+03	No	No	<Tier I	No
Endosulfan sulfate	ug/kg	8	38%	1.14E+00	1.90E+00	No	ND	--	No	1.20E+07	No	1.20E+06	No	No	<Tier I	No
Endrin	ug/kg	8	13%	1.99E+00	2.20E+00	No	ND	--	No	6.10E+05	No	6.10E+04	No	No	<Tier I	No
Endrin aldehyde	ug/kg	8	13%	7.50E-01	7.50E-01	No	ND	--	No	6.10E+05	No	6.10E+04	No	No	<Tier I	No
Endrin ketone	ug/kg	8	25%	4.50E-01	6.70E-01	No	ND	--	No	6.10E+05	No	6.10E+04	No	No	<Tier I	No
Fluoranthene	ug/kg	8	88%	1.38E+03	9.80E+03	No	5.02E+02	Yes	No	8.20E+07	No	8.20E+07	No	No	<Tier I	No
Fluorene	ug/kg	8	13%	1.56E+02	5.80E+02	No	ND	--	No	8.20E+07	No	8.20E+07	No	No	<Tier I	No
Gamma Chlordane	ug/kg	8	25%	4.70E+00	1.80E+01	No	ND	--	No	4.00E+03	No	1.20E+04	No	No	<Tier I	No
gamma-BHC (Lindane)	ug/kg	8	13%	1.30E-01	1.30E-01	No	ND	--	No	4.00E+03	No	9.60E+04	No	No	<Tier I	No
Heptachlor	ug/kg	8	13%	1.78E+00	4.10E+00	No	ND	--	No	1.00E+03	No	1.60E+04	No	No	<Tier I	No
Heptachlor epoxide	ug/kg	8	13%	1.80E-01	1.60E-01	No	ND	--	No	6.00E+02	No	2.70E+03	No	No	<Tier I	No
Indeno(1,2,3-cd)pyrene	ug/kg	8	50%	2.20E+02	1.10E+03	No	ND	--	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Iron	mg/kg	8	100%	1.36E+04	1.90E+04	Yes	3.80E+04	No	Yes	NA	No	NA	No	No	EN	--
Lead	mg/kg	8	100%	5.54E+01	1.10E+02	No	1.85E+02	No	Yes	7.50E+02	No	7.50E+02	No	No	<Tier I	No
Magnesium	mg/kg	8	100%	8.71E+03	1.80E+04	Yes	1.72E+04	Yes	Yes	NA	No	NA	No	No	EN	--
Manganese	mg/kg	8	100%	3.85E+02	6.60E+02	No	8.83E+02	No	Yes	9.10E+04	No	8.70E+03	No	No	<Tier I	No

Surface Soil - Industrial TACO Screen
Transect 6

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
MCPP	ug/kg	8	13%	1.55E+03	4.50E+03	No	9.97E+03	No	Yes	8.80E+05	No	8.80E+05	No	No	<Tier I	No
Mercury	mg/kg	8	100%	5.73E-02	8.60E-02	No	1.77E-01	No	Yes	6.10E+02	No	6.10E+01	No	No	<Tier I	No
Methoxychlor	ug/kg	8	38%	3.60E+00	5.50E+00	No	ND	--	No	1.00E+07	No	1.00E+06	No	No	<Tier I	No
Molybdenum	mg/kg	8	100%	8.40E-01	3.20E+00	No	2.02E+00	Yes	No	1.00E+04	No	1.00E+04	No	No	<Tier I	No
Nickel	mg/kg	8	100%	1.73E+01	2.30E+01	No	4.27E+01	No	Yes	2.10E+04	No	4.10E+03	No	No	<Tier I	No
Pentachlorophenol	ug/kg	8	63%	2.40E+02	2.49E+02	No	See notes	--	No	2.40E+04	No	5.20E+05	No	No	<Tier I	No
Phenanthrene	ug/kg	8	75%	9.75E+02	7.10E+03	No	3.35E+02	Yes	No	6.10E+08	No	6.10E+08	No	No	<Tier I	No
Potassium	mg/kg	8	100%	1.78E+03	2.40E+03	Yes	4.73E+03	No	Yes	NA	No	NA	No	No	EN	--
Pyrene	ug/kg	8	75%	1.11E+03	7.70E+03	No	4.35E+02	Yes	No	6.10E+07	No	6.10E+07	No	No	<Tier I	No
Selenium	mg/kg	8	13%	5.66E-01	6.80E-01	No	ND	--	No	1.00E+04	No	1.00E+03	No	No	<Tier I	No
Silver	mg/kg	8	13%	2.90E-01	2.90E-01	No	1.35E+00	No	Yes	1.00E+04	No	1.00E+03	No	No	<Tier I	No
Thallium	mg/kg	8	25%	6.19E-01	9.70E-01	No	ND	--	No	1.60E+02	No	1.60E+02	No	No	<Tier I	No
Toluene	ug/kg	8	13%	2.20E+00	2.20E+00	No	ND	--	No	6.50E+05	No	4.20E+04	No	No	<Tier I	No
Total PCBs	ug/kg	8	75%	8.31E+01	3.85E+02	No	See notes	--	No	1.00E+03	No	1.00E+03	No	No	<Tier I	No
Vanadium	mg/kg	8	100%	2.54E+01	3.30E+01	No	6.90E+01	No	Yes	1.40E+04	No	1.40E+03	No	No	<Tier I	No
Zinc	mg/kg	8	100%	1.56E+02	3.50E+02	No	8.08E+02	No	Yes	6.10E+05	No	6.10E+04	No	No	<Tier I	No

Surface Soil - Industrial TACO Screen
Transect 7

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD TEQ	ug/kg	3	100%	2.80E-03	5.23E-03	No	1.24E-01	No	Yes	1.00E+00	No	1.00E+00	No	No	<Tier I	No
2-Butanone (MEK)	ug/kg	9	33%	1.84E+01	3.70E+01	No	ND	--	No	2.80E+07	No	2.80E+07	No	No	<Tier I	No
2-Methylnaphthalene	ug/kg	9	11%	6.50E+01	6.50E+01	No	ND	--	No	8.20E+07	No	8.20E+06	No	No	<Tier I	No
4,4'-DDD	ug/kg	9	11%	1.30E+00	1.30E+00	No	ND	--	No	2.40E+04	No	5.20E+05	No	No	<Tier I	No
4,4'-DDE	ug/kg	9	78%	9.80E+00	5.40E+01	No	1.81E+01	Yes	No	1.70E+04	No	3.70E+05	No	No	<Tier I	No
4,4'-DDT	ug/kg	9	67%	7.71E+00	2.90E+01	No	1.41E+01	Yes	No	1.70E+04	No	1.00E+05	No	No	<Tier I	No
Acenaphthene	ug/kg	9	22%	9.77E+01	1.60E+02	No	ND	--	No	1.20E+08	No	1.20E+08	No	No	<Tier I	No
Acetone	ug/kg	9	56%	1.85E+02	5.00E+02	No	ND	--	No	1.00E+08	No	1.00E+08	No	No	<Tier I	No
Alpha Chlordane	ug/kg	9	22%	2.40E+00	1.10E+01	No	ND	--	No	4.00E+03	No	1.20E+04	No	No	<Tier I	No
Aluminum	mg/kg	9	100%	8.33E+03	1.20E+04	No	2.54E+04	No	Yes	1.00E+05	No	1.00E+05	No	No	<Tier I	No
Anthracene	ug/kg	9	33%	1.18E+02	3.60E+02	No	1.60E+02	Yes	No	6.10E+08	No	6.10E+08	No	No	<Tier I	No
Antimony	mg/kg	9	11%	5.23E-01	7.30E-01	No	3.60E+00	No	Yes	8.20E+02	No	8.20E+01	No	No	<Tier I	No
Arsenic	mg/kg	9	100%	9.99E+00	3.40E+01	No	1.91E+01	Yes	No	3.00E+00	Yes	6.10E+01	No	Yes	>DCInd	No
Barium	mg/kg	9	100%	1.07E+02	2.00E+02	No	3.63E+02	No	Yes	1.40E+05	No	1.40E+04	No	No	<Tier I	No
Benzene	ug/kg	9	22%	3.14E+00	4.80E+00	No	ND	--	No	1.50E+03	No	2.10E+03	No	No	<Tier I	No
Benzo(a)anthracene	ug/kg	9	100%	3.42E+02	1.90E+03	No	2.40E+02	Yes	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(a)pyrene	ug/kg	9	100%	3.74E+02	2.10E+03	No	1.87E+02	Yes	No	8.00E+02	Yes	1.70E+04	No	Yes	>DCInd	No
Benzo(b)fluoranthene	ug/kg	9	100%	4.06E+02	2.20E+03	No	1.79E+02	Yes	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(g,h,i)perylene	ug/kg	9	100%	2.29E+02	1.10E+03	No	1.27E+02	Yes	No	6.10E+07	No	6.10E+07	No	No	<Tier I	No
Benzo(k)fluoranthene	ug/kg	9	100%	3.54E+02	2.10E+03	No	2.08E+02	Yes	No	7.80E+04	No	1.70E+06	No	No	<Tier I	No
Beryllium	mg/kg	9	33%	4.23E-01	8.25E-01	No	1.51E+00	No	Yes	2.11E+03	No	4.08E+02	No	No	<Tier I	No
bis(2-Ethylhexyl)phthalate	ug/kg	9	44%	7.18E+01	9.10E+01	No	3.22E+02	No	Yes	4.10E+05	No	4.10E+06	No	No	<Tier I	No
Butylbenzylphthalate	ug/kg	9	11%	5.80E+01	5.80E+01	No	ND	--	No	9.30E+05	No	9.30E+05	No	No	<Tier I	No
Cadmium	mg/kg	9	100%	3.12E+00	6.10E+00	No	8.65E+00	No	Yes	2.00E+03	No	2.00E+02	No	No	<Tier I	No
Calcium	mg/kg	9	100%	1.46E+04	3.80E+04	Yes	3.35E+04	Yes	Yes	NA	No	NA	No	No	EN	--
Carbazole	ug/kg	9	33%	1.16E+02	3.10E+02	No	6.40E+01	Yes	No	2.90E+05	No	6.20E+06	No	No	<Tier I	No
Carbon disulfide	ug/kg	9	22%	3.17E+00	4.30E+00	No	ND	--	No	7.20E+05	No	9.00E+03	No	No	<Tier I	No
Chromium	mg/kg	9	100%	1.53E+01	2.00E+01	No	3.93E+01	No	Yes	4.20E+02	No	4.10E+03	No	No	<Tier I	No
Chrysene	ug/kg	9	100%	4.86E+02	2.60E+03	No	2.73E+02	Yes	No	7.80E+05	No	1.70E+07	No	No	<Tier I	No
Cobalt	mg/kg	9	100%	6.63E+00	7.80E+00	No	1.55E+01	No	Yes	1.20E+05	No	1.20E+04	No	No	<Tier I	No
Copper	mg/kg	9	100%	4.29E+01	1.30E+02	No	2.09E+02	No	Yes	8.20E+04	No	8.20E+03	No	No	<Tier I	No
delta-BHC	ug/kg	9	11%	1.80E-01	1.80E-01	No	ND	--	No	9.00E+02	No	2.10E+03	No	No	<Tier I	No
Dibenzo(a,h)anthracene	ug/kg	9	33%	1.03E+02	4.10E+02	No	ND	--	No	8.00E+02	No	1.70E+04	No	No	<Tier I	No
Dibenzofuran	ug/kg	9	11%	5.20E+01	5.20E+01	No	ND	--	No	5.10E+06	No	5.10E+06	No	No	<Tier I	No
Dicamba	ug/kg	9	11%	2.65E+00	2.65E+00	No	ND	--	No	2.60E+07	No	2.60E+07	No	No	<Tier I	No
Dieldrin	ug/kg	9	22%	1.81E+00	3.00E+00	No	ND	--	No	4.00E+02	No	3.10E+03	No	No	<Tier I	No
Di-n-butylphthalate	ug/kg	9	78%	8.86E+01	1.70E+02	No	3.12E+02	No	Yes	2.30E+06	No	2.30E+06	No	No	<Tier I	No
Endosulfan II	ug/kg	9	11%	1.00E+00	1.00E+00	No	ND	--	No	1.20E+07	No	1.20E+06	No	No	<Tier I	No
Endrin	ug/kg	9	22%	2.50E-01	4.00E-01	No	ND	--	No	6.10E+05	No	6.10E+04	No	No	<Tier I	No
Endrin ketone	ug/kg	9	44%	1.40E+00	1.90E+00	No	ND	--	No	6.10E+05	No	6.10E+04	No	No	<Tier I	No
Ethylbenzene	ug/kg	9	11%	2.75E+00	3.00E+00	No	ND	--	No	4.00E+05	No	5.80E+04	No	No	<Tier I	No
Fluoranthene	ug/kg	9	100%	9.60E+02	5.60E+03	No	5.02E+02	Yes	No	8.20E+07	No	8.20E+07	No	No	<Tier I	No
Fluorene	ug/kg	9	22%	9.51E+01	1.40E+02	No	ND	--	No	8.20E+07	No	8.20E+07	No	No	<Tier I	No
Gamma Chlordane	ug/kg	9	44%	1.97E+00	1.00E+01	No	ND	--	No	4.00E+03	No	1.20E+04	No	No	<Tier I	No
gamma-BHC (Lindane)	ug/kg	9	11%	8.70E-02	8.70E-02	No	ND	--	No	4.00E+03	No	9.60E+04	No	No	<Tier I	No
Heptachlor epoxide	ug/kg	9	22%	4.40E-01	6.20E-01	No	ND	--	No	6.00E+02	No	2.70E+03	No	No	<Tier I	No
Indeno(1,2,3-cd)pyrene	ug/kg	9	44%	2.40E+02	1.10E+03	No	ND	--	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Iron	mg/kg	9	100%	1.47E+04	1.75E+04	Yes	3.80E+04	No	Yes	NA	No	NA	No	No	EN	--
Lead	mg/kg	9	100%	6.46E+01	1.50E+02	No	1.85E+02	No	Yes	7.50E+02	No	7.50E+02	No	No	<Tier I	No

F-14

Surface Soil - Industrial TACO Screen
Transect 7

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Magnesium	mg/kg	9	100%	5.66E+03	1.10E+04	Yes	1.72E+04	No	Yes	NA	No	NA	No	No	EN	--
Manganese	mg/kg	9	100%	3.45E+02	4.35E+02	No	8.83E+02	No	Yes	9.10E+04	No	8.70E+03	No	No	<Tier I	No
Mercury	mg/kg	9	100%	8.51E-02	1.60E-01	No	1.77E-01	No	Yes	6.10E+02	No	6.10E+01	No	No	<Tier I	No
Methoxychlor	ug/kg	9	56%	6.82E+00	1.00E+01	No	ND	--	No	1.00E+07	No	1.00E+06	No	No	<Tier I	No
Molybdenum	mg/kg	9	89%	7.93E-01	1.80E+00	No	2.02E+00	No	Yes	1.00E+04	No	1.00E+04	No	No	<Tier I	No
Nickel	mg/kg	9	100%	2.17E+01	5.50E+01	No	4.27E+01	Yes	No	2.10E+04	No	4.10E+03	No	No	<Tier I	No
Pentachlorophenol	ug/kg	9	33%	2.41E+02	2.51E+02	No	See notes	--	No	2.40E+04	No	5.20E+05	No	No	<Tier I	No
Phenanthrene	ug/kg	9	100%	5.09E+02	2.90E+03	No	3.35E+02	Yes	No	6.10E+08	No	6.10E+08	No	No	<Tier I	No
Potassium	mg/kg	9	100%	2.02E+03	2.85E+03	Yes	4.73E+03	No	Yes	NA	No	NA	No	No	EN	--
Pyrene	ug/kg	9	100%	6.86E+02	3.90E+03	No	4.35E+02	Yes	No	6.10E+07	No	6.10E+07	No	No	<Tier I	No
Selenium	mg/kg	9	67%	6.93E-01	1.10E+00	No	ND	--	No	1.00E+04	No	1.00E+03	No	No	<Tier I	No
Silver	mg/kg	9	44%	3.65E-01	4.40E-01	No	1.35E+00	No	Yes	1.00E+04	No	1.00E+03	No	No	<Tier I	No
Thallium	mg/kg	9	11%	5.72E-01	8.50E-01	No	ND	--	No	1.60E+02	No	1.60E+02	No	No	<Tier I	No
Toluene	ug/kg	9	44%	4.68E+00	1.20E+01	No	ND	--	No	6.50E+05	No	4.20E+04	No	No	<Tier I	No
Total PCBs	ug/kg	9	89%	3.52E+01	9.00E+01	No	See notes	--	No	1.00E+03	No	1.00E+03	No	No	<Tier I	No
Trichloroethene	ug/kg	9	11%	2.56E+00	2.60E+00	No	ND	--	No	8.90E+03	No	1.20E+04	No	No	<Tier I	No
Vanadium	mg/kg	9	100%	2.47E+01	3.25E+01	No	6.90E+01	No	Yes	1.40E+04	No	1.40E+03	No	No	<Tier I	No
Xylenes, Total	ug/kg	9	11%	3.18E+00	4.20E+00	No	ND	--	No	4.10E+05	No	4.10E+05	No	No	<Tier I	No
Zinc	mg/kg	9	100%	3.84E+02	8.70E+02	No	8.08E+02	Yes	No	6.10E+05	No	6.10E+04	No	No	<Tier I	No

Subsurface Soil - Industrial TACO Screen
Transect 1

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Subsurface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD TEQ	ug/kg	3	100%	1.33E-05	2.00E-05	No	1.38E-03	No	Yes	1.00E+00	No	1.00E+00	No	No	<Tier I	No
2-Butanone (MEK)	ug/kg	10	10%	1.71E+01	2.50E+01	No	ND	--	No	2.80E+07	No	2.80E+07	No	No	<Tier I	No
4,4'-DDD	ug/kg	10	10%	5.30E-01	5.30E-01	No	ND	--	No	2.40E+04	No	5.20E+05	No	No	<Tier I	No
4,4'-DDE	ug/kg	10	20%	1.80E-01	2.20E-01	No	ND	--	No	1.70E+04	No	3.70E+05	No	No	<Tier I	No
4,4'-DDT	ug/kg	10	10%	2.70E-01	2.70E-01	No	ND	--	No	1.70E+04	No	1.00E+05	No	No	<Tier I	No
Acetone	ug/kg	10	10%	5.34E+01	2.40E+02	No	1.10E+01	Yes	No	1.00E+08	No	1.00E+08	No	No	<Tier I	No
Alpha Chlordane	ug/kg	10	10%	5.80E-01	5.80E-01	No	ND	--	No	4.00E+03	No	1.20E+04	No	No	<Tier I	No
Aluminum	mg/kg	10	100%	7.36E+03	1.70E+04	No	2.03E+04	No	Yes	1.00E+05	No	1.00E+05	No	No	<Tier I	No
Antimony	mg/kg	10	50%	6.86E-01	8.40E-01	No	2.40E+00	No	Yes	8.20E+02	No	8.20E+01	No	No	<Tier I	No
Arsenic	mg/kg	10	100%	5.82E+00	8.70E+00	No	1.74E+01	No	Yes	3.00E+00	Yes	6.10E+01	No	No	<BK	No
Barium	mg/kg	10	100%	1.85E+02	2.60E+02	No	3.73E+02	No	Yes	1.40E+05	No	1.40E+04	No	No	<Tier I	No
Beryllium	mg/kg	10	100%	4.59E-01	9.30E-01	No	1.27E+00	No	Yes	2.11E+03	No	4.08E+02	No	No	<Tier I	No
bis(2-Ethylhexyl)phthalate	ug/kg	10	20%	1.02E+02	1.50E+02	No	ND	--	No	4.10E+05	No	4.10E+06	No	No	<Tier I	No
Cadmium	mg/kg	10	90%	2.78E-01	5.30E-01	No	6.87E+00	No	Yes	2.00E+03	No	2.00E+02	No	No	<Tier I	No
Calcium	mg/kg	10	100%	1.29E+04	1.80E+04	Yes	1.61E+04	Yes	Yes	NA	No	NA	No	No	EN	--
Chromium	mg/kg	10	100%	1.25E+01	2.50E+01	No	3.27E+01	No	Yes	4.20E+02	No	4.10E+03	No	No	<Tier I	No
Cobalt	mg/kg	10	100%	5.98E+00	1.10E+01	No	1.39E+01	No	Yes	1.20E+05	No	1.20E+04	No	No	<Tier I	No
Copper	mg/kg	10	100%	1.29E+01	2.40E+01	No	1.55E+02	No	Yes	8.20E+04	No	8.20E+03	No	No	<Tier I	No
Dicamba	ug/kg	10	10%	1.30E+00	1.30E+00	No	ND	--	No	2.60E+07	No	2.60E+07	No	No	<Tier I	No
Dieldrin	ug/kg	10	20%	6.60E-01	1.20E+00	No	ND	--	No	4.00E+02	No	3.10E+03	No	No	<Tier I	No
Endrin ketone	ug/kg	10	20%	2.25E-01	2.70E-01	No	ND	--	No	6.10E+05	No	6.10E+04	No	No	<Tier I	No
Heptachlor	ug/kg	10	10%	2.60E-01	2.60E-01	No	ND	--	No	1.00E+03	No	1.60E+04	No	No	<Tier I	No
Heptachlor epoxide	ug/kg	10	30%	3.26E-01	5.70E-01	No	ND	--	No	6.00E+02	No	2.70E+03	No	No	<Tier I	No
Iron	mg/kg	10	100%	1.28E+04	2.20E+04	Yes	3.33E+04	No	Yes	NA	No	NA	No	No	EN	--
Lead	mg/kg	10	100%	9.53E+00	1.50E+01	No	1.42E+02	No	Yes	7.50E+02	No	7.50E+02	No	No	<Tier I	No
Magnesium	mg/kg	10	100%	5.90E+03	8.30E+03	Yes	9.33E+03	No	Yes	NA	No	NA	No	No	EN	--
Manganese	mg/kg	10	100%	3.57E+02	9.80E+02	No	8.00E+02	Yes	No	9.10E+04	No	8.70E+03	No	No	<Tier I	No
MCPA	ug/kg	10	10%	1.24E+03	1.70E+03	No	ND	--	No	4.40E+05	No	4.40E+05	No	No	<Tier I	No
Mercury	mg/kg	10	70%	2.18E-02	7.00E-02	No	5.61E-02	Yes	No	6.10E+02	No	6.10E+01	No	No	<Tier I	No
Methoxychlor	ug/kg	10	20%	2.10E+00	2.60E+00	No	ND	--	No	1.00E+07	No	1.00E+06	No	No	<Tier I	No
Methylene chloride	ug/kg	10	10%	2.40E+00	2.40E+00	No	2.80E+00	No	Yes	2.40E+04	No	3.40E+04	No	No	<Tier I	No
Molybdenum	mg/kg	10	100%	3.98E-01	7.60E-01	No	1.75E+00	No	Yes	1.00E+04	No	1.00E+04	No	No	<Tier I	No
Nickel	mg/kg	10	100%	1.63E+01	3.30E+01	No	3.73E+01	No	Yes	2.10E+04	No	4.10E+03	No	No	<Tier I	No
Potassium	mg/kg	10	100%	1.42E+03	2.70E+03	Yes	4.20E+03	No	Yes	NA	No	NA	No	No	EN	--
Total PCBs	ug/kg	10	30%	1.10E+01	1.90E+01	No	ND	--	No	1.00E+03	No	1.00E+03	No	No	<Tier I	No
Trichloroethene	ug/kg	10	30%	3.70E+00	7.40E+00	No	ND	--	No	8.90E+03	No	1.20E+04	No	No	<Tier I	No
Vanadium	mg/kg	10	100%	2.24E+01	4.50E+01	No	5.80E+01	No	Yes	1.40E+04	No	1.40E+03	No	No	<Tier I	No
Zinc	mg/kg	10	100%	6.52E+01	2.50E+02	No	6.41E+02	No	Yes	6.10E+05	No	6.10E+04	No	No	<Tier I	No

Subsurface Soil - Industrial TACO Screen
Transect 2

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Subsurface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD TEQ	ug/kg	2	100%	5.75E-02	6.50E-02	No	1 38E-03	Yes	No	1.00E+00	No	1.00E+00	No	No	<Tier I	No
2-Butanone (MEK)	ug/kg	9	11%	1.70E+01	2.33E+01	No	ND	--	No	2.80E+07	No	2.80E+07	No	No	<Tier I	No
Acetone	ug/kg	9	22%	3.98E+01	1.07E+02	No	1 10E+01	Yes	No	1.00E+08	No	1.00E+08	No	No	<Tier I	No
Aluminum	mg/kg	9	100%	5.61E+03	1.10E+04	No	2.03E+04	No	Yes	1.00E+05	No	1.00E+05	No	No	<Tier I	No
Antimony	mg/kg	9	11%	6.70E-01	6.70E-01	No	2 40E+00	No	Yes	8.20E+02	No	8.20E+01	No	No	<Tier I	No
Arsenic	mg/kg	9	100%	4.67E+00	7.00E+00	No	1.74E+01	No	Yes	3.00E+00	Yes	6.10E+01	No	No	<BK	No
Barium	mg/kg	9	100%	1.63E+02	2.20E+02	No	3.73E+02	No	Yes	1.40E+05	No	1.40E+04	No	No	<Tier I	No
Beryllium	mg/kg	9	44%	2.63E-01	3.70E-01	No	1.27E+00	No	Yes	2.11E+03	No	4.08E+02	No	No	<Tier I	No
bis(2-Ethylhexyl)phthalate	ug/kg	9	56%	9.23E+01	1 60E+02	No	ND	--	No	4.10E+05	No	4.10E+06	No	No	<Tier I	No
Cadmium	mg/kg	9	100%	2 01E-01	3.20E-01	No	6.87E+00	No	Yes	2.00E+03	No	2.00E+02	No	No	<Tier I	No
Calcium	mg/kg	9	100%	1.16E+04	1.50E+04	Yes	1.61E+04	No	Yes	NA	No	NA	No	No	EN	--
Chromium	mg/kg	9	100%	9.61E+00	1.50E+01	No	3.27E+01	No	Yes	4.20E+02	No	4 10E+03	No	No	<Tier I	No
Cobalt	mg/kg	9	100%	5.21E+00	8.30E+00	No	1.39E+01	No	Yes	1.20E+05	No	1 20E+04	No	No	<Tier I	No
Copper	mg/kg	9	100%	8.64E+00	1.60E+01	No	1 55E+02	No	Yes	8.20E+04	No	8.20E+03	No	No	<Tier I	No
Dieldrin	ug/kg	9	11%	4.10E-01	4.10E-01	No	ND	--	No	4.00E+02	No	3.10E+03	No	No	<Tier I	No
Iron	mg/kg	9	100%	1.05E+04	1.60E+04	Yes	3.33E+04	No	Yes	NA	No	NA	No	No	EN	--
Lead	mg/kg	9	100%	7.82E+00	1.20E+01	No	1.42E+02	No	Yes	7.50E+02	No	7.50E+02	No	No	<Tier I	No
Magnesium	mg/kg	9	100%	5.19E+03	6.80E+03	Yes	9.33E+03	No	Yes	NA	No	NA	No	No	EN	--
Manganese	mg/kg	9	100%	2.37E+02	4.80E+02	No	8.00E+02	No	Yes	9.10E+04	No	8.70E+03	No	No	<Tier I	No
Mercury	mg/kg	9	67%	1.24E-02	2.90E-02	No	5.61E-02	No	Yes	6.10E+02	No	6.10E+01	No	No	<Tier I	No
Molybdenum	mg/kg	9	100%	4.59E-01	7.70E-01	No	1.75E+00	No	Yes	1.00E+04	No	1.00E+04	No	No	<Tier I	No
Nickel	mg/kg	9	100%	1.28E+01	2.00E+01	No	3.73E+01	No	Yes	2.10E+04	No	4.10E+03	No	No	<Tier I	No
Potassium	mg/kg	9	100%	1.16E+03	2.00E+03	Yes	4.20E+03	No	Yes	NA	No	NA	No	No	EN	--
Selenium	mg/kg	9	11%	5.05E-01	5.10E-01	No	ND	--	No	1.00E+04	No	1.00E+03	No	No	<Tier I	No
Thallium	mg/kg	9	11%	5.38E-01	5.65E-01	No	ND	--	No	1.60E+02	No	1.60E+02	No	No	<Tier I	No
Vanadium	mg/kg	9	100%	1.77E+01	2.80E+01	No	5.80E+01	No	Yes	1.40E+04	No	1.40E+03	No	No	<Tier I	No
Zinc	mg/kg	9	100%	3.69E+01	5.70E+01	No	6.41E+02	No	Yes	6 10E+05	No	6.10E+04	No	No	<Tier I	No

F-17

Suburface Soil - Industrial TACO Screen
Transect 3

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Subsurface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
2-Butanone (MEK)	ug/kg	10	10%	1 67E+01	2.40E+01	No	ND	--	No	2.80E+07	No	2.80E+07	No	No	<Tier I	No
Acetone	ug/kg	10	10%	4.65E+01	1.80E+02	No	1.10E+01	Yes	No	1.00E+08	No	1.00E+08	No	No	<Tier I	No
Aluminum	mg/kg	10	100%	7.35E+03	1 40E+04	No	2.03E+04	No	Yes	1.00E+05	No	1.00E+05	No	No	<Tier I	No
Antimony	mg/kg	10	40%	7.91E-01	9.15E-01	No	2.40E+00	No	Yes	8 20E+02	No	8.20E+01	No	No	<Tier I	No
Arsenic	mg/kg	10	100%	5.35E+00	8.50E+00	No	1.74E+01	No	Yes	3.00E+00	Yes	6.10E+01	No	No	<BK	No
Barium	mg/kg	10	100%	1.84E+02	2.50E+02	No	3.73E+02	No	Yes	1.40E+05	No	1.40E+04	No	No	<Tier I	No
Benzo(g,h,i)perylene	ug/kg	10	40%	9.23E+01	1.10E+02	No	6.80E+01	Yes	No	6.10E+07	No	6.10E+07	No	No	<Tier I	No
Beryllium	mg/kg	10	50%	3.97E-01	8.90E-01	No	1.27E+00	No	Yes	2.11E+03	No	4.08E+02	No	No	<Tier I	No
bis(2-Ethylhexyl)phthalate	ug/kg	10	40%	9.70E+01	1.20E+02	No	ND	--	No	4.10E+05	No	4.10E+06	No	No	<Tier I	No
Cadmium	mg/kg	10	90%	2.93E-01	5.70E-01	No	6.87E+00	No	Yes	2.00E+03	No	2.00E+02	No	No	<Tier I	No
Calcium	mg/kg	10	100%	1.26E+04	1.90E+04	Yes	1.61E+04	Yes	Yes	NA	No	NA	No	No	EN	--
Chromium	mg/kg	10	100%	1.20E+01	2.10E+01	No	3.27E+01	No	Yes	4.20E+02	No	4.10E+03	No	No	<Tier I	No
Cobalt	mg/kg	10	100%	5.82E+00	8.10E+00	No	1.39E+01	No	Yes	1.20E+05	No	1.20E+04	No	No	<Tier I	No
Copper	mg/kg	10	100%	1.16E+01	1.90E+01	No	1 55E+02	No	Yes	8.20E+04	No	8.20E+03	No	No	<Tier I	No
Dibenzo(a,h)anthracene	ug/kg	10	10%	5.74E+01	8.70E+01	No	ND	--	No	8.00E+02	No	1.70E+04	No	No	<Tier I	No
Indeno(1,2,3-cd)pyrene	ug/kg	10	10%	9.10E+01	9.20E+01	No	ND	--	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Iron	mg/kg	10	100%	1.27E+04	1.90E+04	Yes	3.33E+04	No	Yes	NA	No	NA	No	No	EN	--
Lead	mg/kg	10	100%	9.70E+00	1.70E+01	No	1.42E+02	No	Yes	7.50E+02	No	7.50E+02	No	No	<Tier I	No
Magnesium	mg/kg	10	100%	5.82E+03	7.70E+03	Yes	9.33E+03	No	Yes	NA	No	NA	No	No	EN	--
Manganese	mg/kg	10	100%	2.69E+02	5.50E+02	No	8 00E+02	No	Yes	9.10E+04	No	8.70E+03	No	No	<Tier I	No
Mercury	mg/kg	10	100%	2.41E-02	7.80E-02	No	5.61E-02	Yes	No	6.10E+02	No	6.10E+01	No	No	<Tier I	No
Molybdenum	mg/kg	10	100%	5 29E-01	9.50E-01	No	1.75E+00	No	Yes	1.00E+04	No	1.00E+04	No	No	<Tier I	No
Nickel	mg/kg	10	100%	1 50E+01	2.20E+01	No	3.73E+01	No	Yes	2.10E+04	No	4.10E+03	No	No	<Tier I	No
Pentachlorophenol	ug/kg	10	20%	2 50E+02	2 76E+02	No	ND	--	No	2 40E+04	No	5 20E+05	No	No	<Tier I	No
Potassium	mg/kg	10	100%	1.57E+03	2 70E+03	Yes	4 20E+03	No	Yes	NA	No	NA	No	No	EN	--
Sodium	mg/kg	10	30%	8 74E+01	1.60E+02	Yes	3.53E+02	No	Yes	NA	No	NA	No	No	EN	--
Total PCBs	ug/kg	10	10%	9 17E+00	9.50E+00	No	ND	--	No	1 00E+03	No	1.00E+03	No	No	<Tier I	No
Vanadium	mg/kg	10	100%	2.16E+01	3 80E+01	No	5 80E+01	No	Yes	1 40E+04	No	1.40E+03	No	No	<Tier I	No
Zinc	mg/kg	10	100%	6.73E+01	2.60E+02	No	6 41E+02	No	Yes	6.10E+05	No	6.10E+04	No	No	<Tier I	No

F-18

Subsurface Soil - Industrial TACO Screen
Transect 4

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Subsurface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
2,4,5-TP (Silvex)	ug/kg	10	10%	1.50E+00	1.50E+00	No	1.08E+01	No	Yes	1.60E+07	No	1.60E+06	No	No	<Tier I	No
2-Butanone (MEK)	ug/kg	10	10%	5.70E+00	5.70E+00	No	ND	--	No	2.80E+07	No	2.80E+07	No	No	<Tier I	No
2-Methylnaphthalene	ug/kg	10	10%	1.07E+02	1.60E+02	No	ND	--	No	8.20E+07	No	8.20E+06	No	No	<Tier I	No
Acenaphthene	ug/kg	10	10%	1.91E+02	1.00E+03	No	ND	--	No	1.20E+08	No	1.20E+08	No	No	<Tier I	No
Acenaphthylene	ug/kg	10	10%	1.63E+02	7.20E+02	No	ND	--	No	1.20E+08	No	1.20E+08	No	No	<Tier I	No
Acetone	ug/kg	10	50%	5.16E+01	2.20E+02	No	1.10E+01	Yes	No	1.00E+08	No	1.00E+08	No	No	<Tier I	No
Aluminum	mg/kg	10	100%	6.17E+03	9 00E+03	No	2.03E+04	No	Yes	1.00E+05	No	1.00E+05	No	No	<Tier I	No
Anthracene	ug/kg	10	20%	6.27E+02	5.40E+03	No	ND	--	No	6.10E+08	No	6.10E+08	No	No	<Tier I	No
Arsenic	mg/kg	10	100%	4.82E+00	6.00E+00	No	1.74E+01	No	Yes	3.00E+00	Yes	6.10E+01	No	No	<BK	No
Barium	mg/kg	10	100%	1.55E+02	2.10E+02	No	3.73E+02	No	Yes	1.40E+05	No	1.40E+04	No	No	<Tier I	No
Benzo(a)anthracene	ug/kg	10	40%	1.28E+03	1.20E+04	No	5.20E+01	Yes	No	8.00E+03	Yes	1.70E+05	No	Yes	>DCind	No
Benzo(a)pyrene	ug/kg	10	10%	6.09E+02	5.60E+03	No	ND	--	No	8 00E+02	Yes	1.70E+04	No	Yes	>DCind	No
Benzo(b)fluoranthene	ug/kg	10	10%	1.07E+03	9.80E+03	No	ND	--	No	8.00E+03	Yes	1.70E+05	No	Yes	>DCind	No
Benzo(g,h,i)perylene	ug/kg	10	20%	1.09E+02	3.30E+02	No	6.80E+01	Yes	No	6.10E+07	No	6.10E+07	No	No	<Tier I	No
Benzo(k)fluoranthene	ug/kg	10	10%	7 21E+02	6.30E+03	No	ND	--	No	7.80E+04	No	1.70E+06	No	No	<Tier I	No
Beryllium	mg/kg	10	100%	3.72E-01	5.00E-01	No	1.27E+00	No	Yes	2.11E+03	No	4.08E+02	No	No	<Tier I	No
beta-BHC	ug/kg	10	10%	2.00E-01	2 00E-01	No	ND	--	No	9 00E+02	No	2.10E+03	No	No	<Tier I	No
bis(2-Ethylhexyl)phthalate	ug/kg	10	20%	9.65E+02	8.70E+03	No	ND	--	No	4 10E+05	No	4.10E+06	No	No	<Tier I	No
Cadmium	mg/kg	10	70%	3 33E-01	1.00E+00	No	6.87E+00	No	Yes	2.00E+03	No	2.00E+02	No	No	<Tier I	No
Calcium	mg/kg	10	100%	2 43E+04	1.30E+05	Yes	1.61E+04	Yes	Yes	NA	No	NA	No	No	EN	--
Carbazole	ug/kg	10	10%	1.73E+02	8 20E+02	No	ND	--	No	2.90E+05	No	6.20E+06	No	No	<Tier I	No
Chromium	mg/kg	10	100%	1.22E+01	1.70E+01	No	3.27E+01	No	Yes	4 20E+02	No	4.10E+03	No	No	<Tier I	No
Chrysene	ug/kg	10	40%	1.18E+03	1.10E+04	No	8.40E+01	Yes	No	7.80E+05	No	1.70E+07	No	No	<Tier I	No
Cobalt	mg/kg	10	100%	5.06E+00	6.10E+00	No	1 39E+01	No	Yes	1 20E+05	No	1.20E+04	No	No	<Tier I	No
Copper	mg/kg	10	100%	1.16E+01	3.00E+01	No	1.55E+02	No	Yes	8.20E+04	No	8.20E+03	No	No	<Tier I	No
delta-BHC	ug/kg	10	20%	1.75E-01	2.30E-01	No	ND	--	No	9 00E+02	No	2.10E+03	No	No	<Tier I	No
Dibenzo(a,h)anthracene	ug/kg	10	10%	2.39E+02	1.90E+03	No	ND	--	No	8.00E+02	Yes	1.70E+04	No	Yes	>DCind	No
Dibenzofuran	ug/kg	10	10%	2.01E+02	1.10E+03	No	ND	--	No	5 10E+06	No	5.10E+06	No	No	<Tier I	No
Dieldrin	ug/kg	10	10%	1.30E+00	1.30E+00	No	ND	--	No	4 00E+02	No	3.10E+03	No	No	<Tier I	No
Endosulfan sulfate	ug/kg	10	10%	1.00E+00	1.00E+00	No	ND	--	No	1 20E+07	No	1.20E+06	No	No	<Tier I	No
Endrin ketone	ug/kg	10	10%	2.90E-01	2.90E-01	No	ND	--	No	6.10E+05	No	6.10E+04	No	No	<Tier I	No
Fluoranthene	ug/kg	10	30%	2.39E+03	2.30E+04	No	8.40E+01	Yes	No	8.20E+07	No	8.20E+07	No	No	<Tier I	No
Fluorene	ug/kg	10	10%	2.91E+02	2.00E+03	No	ND	--	No	8.20E+07	No	8.20E+07	No	No	<Tier I	No
Indeno(1,2,3-cd)pyrene	ug/kg	10	10%	4.41E+02	3.50E+03	No	ND	--	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Iron	mg/kg	10	100%	1.13E+04	1.60E+04	Yes	3.33E+04	No	Yes	NA	No	NA	No	No	EN	--
Lead	mg/kg	10	100%	2.36E+01	1.30E+02	No	1.42E+02	No	Yes	7.50E+02	No	7 50E+02	No	No	<Tier I	No
Magnesium	mg/kg	10	100%	6.15E+03	1.10E+04	Yes	9.33E+03	Yes	Yes	NA	No	NA	No	No	EN	--
Manganese	mg/kg	10	100%	2.59E+02	3.55E+02	No	8.00E+02	No	Yes	9.10E+04	No	8.70E+03	No	No	<Tier I	No
Mercury	mg/kg	10	80%	1.54E-02	3.90E-02	No	5.61E-02	No	Yes	6 10E+02	No	6.10E+01	No	No	<Tier I	No
Methoxychlor	ug/kg	10	10%	7.60E+00	7.60E+00	No	ND	--	No	1.00E+07	No	1.00E+06	No	No	<Tier I	No
Molybdenum	mg/kg	10	100%	4 07E-01	7.60E-01	No	1.75E+00	No	Yes	1.00E+04	No	1.00E+04	No	No	<Tier I	No
Naphthalene	ug/kg	10	10%	6.40E+01	6.40E+01	No	ND	--	No	8 20E+07	No	8 20E+06	No	No	<Tier I	No
Nickel	mg/kg	10	100%	1.43E+01	1.80E+01	No	3 73E+01	No	Yes	2 10E+04	No	4 10E+03	No	No	<Tier I	No
Pentachlorophenol	ug/kg	10	50%	3.05E+02	5.53E+02	No	ND	--	No	2 40E+04	No	5 20E+05	No	No	<Tier I	No
Phenanthrene	ug/kg	10	30%	1 48E+03	1.40E+04	No	ND	--	No	6 10E+08	No	6 10E+08	No	No	<Tier I	No
Potassium	mg/kg	10	100%	1.24E+03	1 70E+03	Yes	4 20E+03	No	Yes	NA	No	NA	No	No	EN	--
Pyrene	ug/kg	10	30%	1 89E+03	1.80E+04	No	ND	--	No	6 10E+07	No	6 10E+07	No	No	<Tier I	No
Sodium	mg/kg	10	40%	1 17E+02	3 80E+02	Yes	3 53E+02	Yes	Yes	NA	No	NA	No	No	EN	--
Toluene	ug/kg	10	10%	3 13E+00	4 80E+00	No	ND	--	No	6 50E+05	No	4 20E+04	No	No	<Tier I	No

F-19

Suburface Soil - Industrial TACO Screen
Transect 4

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Subsurface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total PCBs	ug/kg	10	50%	1.83E+01	5.39E+01	No	ND	--	No	1.00E+03	No	1.00E+03	No	No	<Tier I	No
Vanadium	mg/kg	10	100%	1.93E+01	2.60E+01	No	5.80E+01	No	Yes	1.40E+04	No	1.40E+03	No	No	<Tier I	No
Zinc	mg/kg	10	100%	5.81E+01	1.90E+02	No	6.41E+02	No	Yes	6.10E+05	No	6.10E+04	No	No	<Tier I	No

F-20

Suburface Soil - Industrial TACO Screen
Transect 5

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Subsurface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD TEQ	ug/kg	2	100%	2.10E-05	3.50E-05	No	1.38E-03	No	Yes	1.00E+00	No	1.00E+00	No	No	<Tier I	No
2,4-DB	ug/kg	9	11%	4.96E+00	7.70E+00	No	ND	--	No	7.00E+06	No	7.00E+06	No	No	<Tier I	No
2-Butanone (MEK)	ug/kg	9	11%	1.30E+01	1.30E+01	No	ND	--	No	2.80E+07	No	2.80E+07	No	No	<Tier I	No
Acetone	ug/kg	9	11%	4.21E+01	1.40E+02	No	1.10E+01	Yes	No	1.00E+08	No	1.00E+08	No	No	<Tier I	No
Aluminum	mg/kg	9	100%	5.96E+03	9.60E+03	No	2.03E+04	No	Yes	1.00E+05	No	1.00E+05	No	No	<Tier I	No
Arsenic	mg/kg	9	100%	4.91E+00	6.40E+00	No	1.74E+01	No	Yes	3.00E+00	Yes	6 10E+01	No	No	<BK	No
Barium	mg/kg	9	100%	1.70E+02	2.10E+02	No	3.73E+02	No	Yes	1.40E+05	No	1.40E+04	No	No	<Tier I	No
Benzene	ug/kg	9	11%	9.80E-01	9.80E-01	No	ND	--	No	1.50E+03	No	2.10E+03	No	No	<Tier I	No
Benzo(b)fluoranthene	ug/kg	9	11%	7.50E+01	7.50E+01	No	ND	--	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(g,h,i)perylene	ug/kg	9	11%	3.00E+01	3.00E+01	No	6.80E+01	No	Yes	6.10E+07	No	6.10E+07	No	No	<Tier I	No
Beryllium	mg/kg	9	100%	3.73E-01	5.60E-01	No	1.27E+00	No	Yes	2.11E+03	No	4 08E+02	No	No	<Tier I	No
bis(2-Ethylhexyl)phthalate	ug/kg	9	56%	9.87E+01	1.20E+02	No	ND	--	No	4.10E+05	No	4 10E+06	No	No	<Tier I	No
Cadmium	mg/kg	9	100%	2 24E-01	3.40E-01	No	6.87E+00	No	Yes	2.00E+03	No	2.00E+02	No	No	<Tier I	No
Calcium	mg/kg	9	100%	1.38E+04	1.90E+04	Yes	1.61E+04	Yes	Yes	NA	No	NA	No	No	EN	--
Chromium	mg/kg	9	100%	1.20E+01	2.00E+01	No	3 27E+01	No	Yes	4.20E+02	No	4.10E+03	No	No	<Tier I	No
Cobalt	mg/kg	9	100%	5.03E+00	6.10E+00	No	1.39E+01	No	Yes	1.20E+05	No	1.20E+04	No	No	<Tier I	No
Copper	mg/kg	9	100%	9.20E+00	1.60E+01	No	1.55E+02	No	Yes	8.20E+04	No	8.20E+03	No	No	<Tier I	No
Dibenzo(a,h)anthracene	ug/kg	9	11%	5.52E+01	9.45E+01	No	ND	--	No	8.00E+02	No	1.70E+04	No	No	<Tier I	No
Di-n-octylphthalate	ug/kg	9	11%	9.86E+01	1.18E+02	No	ND	--	No	1.00E+07	No	4.10E+06	No	No	<Tier I	No
Indeno(1,2,3-cd)pyrene	ug/kg	9	11%	9.81E+01	1.13E+02	No	ND	--	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Iron	mg/kg	9	100%	1.10E+04	1.50E+04	Yes	3.33E+04	No	Yes	NA	No	NA	No	No	EN	--
Lead	mg/kg	9	100%	8.11E+00	1 10E+01	No	1.42E+02	No	Yes	7.50E+02	No	7.50E+02	No	No	<Tier I	No
Magnesium	mg/kg	9	100%	5.47E+03	7.40E+03	Yes	9.33E+03	No	Yes	NA	No	NA	No	No	EN	--
Manganese	mg/kg	9	100%	2.39E+02	3 20E+02	No	8 00E+02	No	Yes	9.10E+04	No	8.70E+03	No	No	<Tier I	No
MCPA	ug/kg	9	11%	1.24E+03	2.30E+03	No	ND	--	No	4.40E+05	No	4.40E+05	No	No	<Tier I	No
MCPP	ug/kg	9	22%	1.49E+03	2.90E+03	No	4.73E+03	No	Yes	8.80E+05	No	8.80E+05	No	No	<Tier I	No
Mercury	mg/kg	9	100%	2.43E-02	8.60E-02	No	5.61E-02	Yes	No	6.10E+02	No	6.10E+01	No	No	<Tier I	No
Molybdenum	mg/kg	9	89%	2.97E-01	4.50E-01	No	1 75E+00	No	Yes	1.00E+04	No	1.00E+04	No	No	<Tier I	No
Nickel	mg/kg	9	100%	1.39E+01	1.70E+01	No	3.73E+01	No	Yes	2.10E+04	No	4 10E+03	No	No	<Tier I	No
Potassium	mg/kg	9	100%	1.23E+03	1.80E+03	Yes	4.20E+03	No	Yes	NA	No	NA	No	No	EN	--
Sodium	mg/kg	9	33%	8 23E+01	1 60E+02	Yes	3.53E+02	No	Yes	NA	No	NA	No	No	EN	--
Toluene	ug/kg	9	11%	1.80E+00	1 80E+00	No	ND	--	No	6.50E+05	No	4 20E+04	No	No	<Tier I	No
Vanadium	mg/kg	9	100%	1.86E+01	2.60E+01	No	5 80E+01	No	Yes	1.40E+04	No	1.40E+03	No	No	<Tier I	No
Zinc	mg/kg	9	100%	3.98E+01	5.60F+01	No	6.41E+02	No	Yes	6.10E+05	No	6.10E+04	No	No	<Tier I	No

F-21

Suburface Soil - Industrial TACO Screen
Transect 6

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Subsurface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD TEQ	ug/kg	2	100%	7.84E-04	1.51E-03	No	1.38E-03	Yes	No	1.00E+00	No	1.00E+00	No	No	<Tier I	No
2-Hexanone	ug/kg	8	13%	3.50E+00	3.50E+00	No	ND	--	No	2.90E+06	No	2.90E+06	No	No	<Tier I	No
Acenaphthene	ug/kg	8	25%	1.00E+02	1.60E+02	No	ND	--	No	1.20E+08	No	1.20E+08	No	No	<Tier I	No
Acenaphthylene	ug/kg	8	13%	4.90E+01	4.90E+01	No	ND	--	No	1.20E+08	No	1.20E+08	No	No	<Tier I	No
Acetone	ug/kg	8	13%	3.04E+01	4.00E+01	No	1.10E+01	Yes	No	1.00E+08	No	1.00E+08	No	No	<Tier I	No
Aluminum	mg/kg	8	100%	7.90E+03	1.20E+04	No	2.03E+04	No	Yes	1.00E+05	No	1.00E+05	No	No	<Tier I	No
Anthracene	ug/kg	8	38%	1.26E+02	3.60E+02	No	ND	--	No	6.10E+08	No	6.10E+08	No	No	<Tier I	No
Antimony	mg/kg	8	25%	1.32E+00	2.60E+00	No	2.40E+00	Yes	No	8.20E+02	No	8.20E+01	No	No	<Tier I	No
Arsenic	mg/kg	8	100%	6.20E+00	7.80E+00	No	1.74E+01	No	Yes	3.00E+00	Yes	6.10E+01	No	No	<BK	No
Barium	mg/kg	8	100%	1.95E+02	2.20E+02	No	3.73E+02	No	Yes	1.40E+05	No	1.40E+04	No	No	<Tier I	No
Benzene	ug/kg	8	13%	2.77E+00	3.00E+00	No	ND	--	No	1.50E+03	No	2.10E+03	No	No	<Tier I	No
Benzo(a)anthracene	ug/kg	8	50%	2.25E+02	9.40E+02	No	5.20E+01	Yes	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(a)pyrene	ug/kg	8	25%	1.85E+02	8.80E+02	No	ND	--	No	8.00E+02	Yes	1.70E+04	No	Yes	>DCind	No
Benzo(b)fluoranthene	ug/kg	8	38%	1.93E+02	6.40E+02	No	ND	--	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(g,h,i)perylene	ug/kg	8	13%	1.88E+02	6.30E+02	No	6.80E+01	Yes	No	6.10E+07	No	6.10E+07	No	No	<Tier I	No
Benzo(k)fluoranthene	ug/kg	8	25%	2.40E+02	1.10E+03	No	ND	--	No	7.80E+04	No	1.70E+06	No	No	<Tier I	No
Beryllium	mg/kg	8	100%	4.84E-01	6.30E-01	No	1.27E+00	No	Yes	2.11E+03	No	4.08E+02	No	No	<Tier I	No
bis(2-Ethylhexyl)phthalate	ug/kg	8	38%	1.25E+02	2.70E+02	No	ND	--	No	4.10E+05	No	4.10E+06	No	No	<Tier I	No
Cadmium	mg/kg	8	100%	5.54E-01	9.60E-01	No	6.87E+00	No	Yes	2.00E+03	No	2.00E+02	No	No	<Tier I	No
Calcium	mg/kg	8	100%	2.60E+04	6.40E+04	Yes	1.61E+04	Yes	Yes	NA	No	NA	No	No	EN	--
Carbazole	ug/kg	8	25%	1.01E+02	1.70E+02	No	ND	--	No	2.90E+05	No	6.20E+06	No	No	<Tier I	No
Chromium	mg/kg	8	100%	1.44E+01	2.10E+01	No	3.27E+01	No	Yes	4.20E+02	No	4.10E+03	No	No	<Tier I	No
Chrysene	ug/kg	8	50%	2.52E+02	1.10E+03	No	8.40E+01	Yes	No	7.80E+05	No	1.70E+07	No	No	<Tier I	No
Cobalt	mg/kg	8	100%	6.31E+00	8.60E+00	No	1.39E+01	No	Yes	1.20E+05	No	1.20E+04	No	No	<Tier I	No
Copper	mg/kg	8	100%	1.88E+01	3.50E+01	No	1.55E+02	No	Yes	8.20E+04	No	8.20E+03	No	No	<Tier I	No
delta-BHC	ug/kg	8	13%	1.40E-01	1.40E-01	No	ND	--	No	9.00E+02	No	2.10E+03	No	No	<Tier I	No
Dibenzo(a,h)anthracene	ug/kg	8	25%	8.46E+01	2.70E+02	No	ND	--	No	8.00E+02	No	1.70E+04	No	No	<Tier I	No
Dibenzofuran	ug/kg	8	13%	1.02E+02	1.20E+02	No	ND	--	No	5.10E+06	No	5.10E+06	No	No	<Tier I	No
Endosulfan sulfate	ug/kg	8	25%	5.00E-01	5.80E-01	No	ND	--	No	1.20E+07	No	1.20E+06	No	No	<Tier I	No
Fluoranthene	ug/kg	8	50%	4.97E+02	2.50E+03	No	8.40E+01	Yes	No	8.20E+07	No	8.20E+07	No	No	<Tier I	No
Fluorene	ug/kg	8	25%	9.39E+01	1.30E+02	No	ND	--	No	8.20E+07	No	8.20E+07	No	No	<Tier I	No
Indeno(1,2,3-cd)pyrene	ug/kg	8	38%	1.64E+02	5.70E+02	No	ND	--	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Iron	mg/kg	8	100%	1.40E+04	1.80E+04	Yes	3.33E+04	No	Yes	NA	No	NA	No	No	EN	--
Lead	mg/kg	8	100%	7.45E+01	2.40E+02	No	1.42E+02	Yes	No	7.50E+02	No	7.50E+02	No	No	<Tier I	No
Magnesium	mg/kg	8	100%	6.10E+03	6.90E+03	Yes	9.33E+03	No	Yes	NA	No	NA	No	No	EN	--
Manganese	mg/kg	8	100%	3.21E+02	4.00E+02	No	8.00E+02	No	Yes	9.10E+04	No	8.70E+03	No	No	<Tier I	No
MCPA	ug/kg	8	13%	1.18E+03	1.40E+03	No	ND	--	No	4.40E+05	No	4.40E+05	No	No	<Tier I	No
MCPP	ug/kg	8	13%	1.39E+03	3.00E+03	No	4.73E+03	No	Yes	8.80E+05	No	8.80E+05	No	No	<Tier I	No
Mercury	mg/kg	8	75%	5.86E-02	1.90E-01	No	5.61E-02	Yes	No	6.10E+02	No	6.10E+01	No	No	<Tier I	No
Molybdenum	mg/kg	8	100%	6.06E-01	1.10E+00	No	1.75E+00	No	Yes	1.00E+04	No	1.00E+04	No	No	<Tier I	No
Naphthalene	ug/kg	8	25%	4.50E+01	4.90E+01	No	ND	--	No	8.20E+07	No	8.20E+06	No	No	<Tier I	No
Nickel	mg/kg	8	100%	1.71E+01	2.40E+01	No	3.73E+01	No	Yes	2.10E+04	No	4.10E+03	No	No	<Tier I	No
Pentachlorophenol	ug/kg	8	25%	2.46E+02	2.51E+02	No	ND	--	No	2.40E+04	No	5.20E+05	No	No	<Tier I	No
Phenanthrene	ug/kg	8	50%	3.82E+02	1.90E+03	No	ND	--	No	6.10E+08	No	6.10E+08	No	No	<Tier I	No
Potassium	mg/kg	8	100%	1.43E+03	2.00E+03	Yes	4.20E+03	No	Yes	NA	No	NA	No	No	EN	--
Pyrene	ug/kg	8	38%	4.59E+02	2.30E+03	No	ND	--	No	6.10E+07	No	6.10E+07	No	No	<Tier I	No
Sodium	mg/kg	8	38%	1.06E+02	1.40E+02	Yes	3.53E+02	No	Yes	NA	No	NA	No	No	EN	--
Toluene	ug/kg	8	25%	3.45E+00	6.60E+00	No	ND	--	No	6.50E+05	No	4.20E+04	No	No	<Tier I	No
Total PCBs	ug/kg	8	13%	4.30E+00	4.30E+00	No	ND	--	No	1.00E+03	No	1.00E+03	No	No	<Tier I	No

F-22

Subsurface Soil - Industrial TACO Screen
Transect 6

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Subsurface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Vanadium	mg/kg	8	100%	2.38E+01	3 30E+01	No	5.80E+01	No	Yes	1.40E+04	No	1.40E+03	No	No	<Tier I	No
Xylenes, Total	ug/kg	8	13%	3.22E+00	4.30E+00	No	ND	--	No	4.10E+05	No	4.10E+05	No	No	<Tier I	No
Zinc	mg/kg	8	100%	8.26E+01	1.60E+02	No	6.41E+02	No	Yes	6.10E+05	No	6.10E+04	No	No	<Tier I	No

F-23

Suburface Soil - Industrial TACO Screen
Transect 7

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Subsurface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD TEQ	ug/kg	1	100%	2.00E-05	2 00E-05	No	1.38E-03	No	Yes	1.00E+00	No	1.00E+00	No	No	<Tier I	No
2-Butanone (MEK)	ug/kg	9	22%	9.50E+00	1 20E+01	No	ND	--	No	2.80E+07	No	2.80E+07	No	No	<Tier I	No
4,4'-DDE	ug/kg	9	22%	1.02E+00	1.70E+00	No	ND	--	No	1.70E+04	No	3.70E+05	No	No	<Tier I	No
Acetone	ug/kg	9	33%	8.78E+01	3.10E+02	No	1.10E+01	Yes	No	1.00E+08	No	1.00E+08	No	No	<Tier I	No
Aluminum	mg/kg	9	100%	9.28E+03	2 20E+04	No	2.03E+04	Yes	No	1.00E+05	No	1.00E+05	No	No	<Tier I	No
Antimony	mg/kg	9	22%	5.80E-01	6.00E-01	No	2.40E+00	No	Yes	8.20E+02	No	8.20E+01	No	No	<Tier I	No
Arsenic	mg/kg	9	100%	5.99E+00	1 10E+01	No	1 74E+01	No	Yes	3.00E+00	Yes	6 10E+01	No	No	<BK	No
Barium	mg/kg	9	100%	2.10E+02	2.90E+02	No	3.73E+02	No	Yes	1.40E+05	No	1 40E+04	No	No	<Tier I	No
Benzene	ug/kg	9	22%	2.96E+00	3.20E+00	No	ND	--	No	1.50E+03	No	2.10E+03	No	No	<Tier I	No
Benzo(a)anthracene	ug/kg	9	22%	3.65E+01	3 70E+01	No	5.20E+01	No	Yes	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(a)pyrene	ug/kg	9	22%	3.60E+01	3 80E+01	No	ND	--	No	8.00E+02	No	1.70E+04	No	No	<Tier I	No
Benzo(b)fluoranthene	ug/kg	9	22%	3.25E+01	3 70E+01	No	ND	--	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(g,h,i)perylene	ug/kg	9	22%	3.55E+01	3.80E+01	No	6.80E+01	No	Yes	6.10E+07	No	6.10E+07	No	No	<Tier I	No
Benzo(k)fluoranthene	ug/kg	9	11%	3.60E+01	3.60E+01	No	ND	--	No	7.80E+04	No	1.70E+06	No	No	<Tier I	No
Beryllium	mg/kg	9	33%	4.33E-01	1.20E+00	No	1.27E+00	No	Yes	2.11E+03	No	4 08E+02	No	No	<Tier I	No
bis(2-Ethylhexyl)phthalate	ug/kg	9	78%	1.08E+03	7.60E+03	No	ND	--	No	4.10E+05	No	4.10E+06	No	No	<Tier I	No
Cadmium	mg/kg	9	100%	1.78E+00	7.90E+00	No	6.87E+00	Yes	No	2.00E+03	No	2.00E+02	No	No	<Tier I	No
Calcium	mg/kg	9	100%	1.20E+04	1.70E+04	Yes	1.61E+04	Yes	Yes	NA	No	NA	No	No	EN	--
Carbon disulfide	ug/kg	9	33%	4.19E+00	7.80E+00	No	ND	--	No	7.20E+05	No	9.00E+03	No	No	<Tier I	No
Chlorobenzene	ug/kg	9	22%	4.10E+00	1.00E+01	No	ND	--	No	2.10E+05	No	1.30E+03	No	No	<Tier I	No
Chromium	mg/kg	9	100%	3.35E+01	1.30E+02	No	3.27E+01	Yes	No	4.20E+02	No	4.10E+03	No	No	<Tier I	No
Chrysene	ug/kg	9	22%	4 55E+01	4 80E+01	No	8.40E+01	No	Yes	7.80E+05	No	1 70E+07	No	No	<Tier I	No
Cobalt	mg/kg	9	100%	6.50E+00	1.10E+01	No	1.39E+01	No	Yes	1.20E+05	No	1.20E+04	No	No	<Tier I	No
Copper	mg/kg	9	100%	1.96E+01	6.20E+01	No	1.55E+02	No	Yes	8.20E+04	No	8.20E+03	No	No	<Tier I	No
Di-n-butylphthalate	ug/kg	9	67%	8.91E+01	1 20E+02	No	ND	--	No	2.30E+06	No	2 30E+06	No	No	<Tier I	No
Endosulfan sulfate	ug/kg	9	22%	4.45E-01	5.70E-01	No	ND	--	No	1.20E+07	No	1 20E+06	No	No	<Tier I	No
Fluoranthene	ug/kg	9	22%	7.95E+01	8.10E+01	No	8.40E+01	No	Yes	8 20E+07	No	8.20E+07	No	No	<Tier I	No
Iron	mg/kg	9	100%	1.39E+04	2.60E+04	Yes	3.33E+04	No	Yes	NA	No	NA	No	No	EN	--
Lead	mg/kg	9	100%	2.24E+01	7.70E+01	No	1.42E+02	No	Yes	7.50E+02	No	7.50E+02	No	No	<Tier I	No
Magnesium	mg/kg	9	100%	5 87E+03	7.10E+03	Yes	9.33E+03	No	Yes	NA	No	NA	No	No	EN	--
Manganese	mg/kg	9	100%	2 59E+02	4.00E+02	No	8.00E+02	No	Yes	9.10E+04	No	8 70E+03	No	No	<Tier I	No
Mercury	mg/kg	9	89%	6.20E-02	2.90E-01	No	5.61E-02	Yes	No	6.10E+02	No	6.10E+01	No	No	<Tier I	No
Molybdenum	mg/kg	9	67%	4.93E-01	7.85E-01	No	1 75E+00	No	Yes	1.00E+04	No	1.00E+04	No	No	<Tier I	No
Nickel	mg/kg	9	100%	2.07E+01	4 20E+01	No	3.73E+01	Yes	No	2.10E+04	No	4.10E+03	No	No	<Tier I	No
Pentachlorophenol	ug/kg	9	33%	2.58E+02	3.01E+02	No	ND	--	No	2.40E+04	No	5 20E+05	No	No	<Tier I	No
Phenanthrene	ug/kg	9	22%	3 65E+01	4.20E+01	No	ND	--	No	6.10E+08	No	6 10E+08	No	No	<Tier I	No
Potassium	mg/kg	9	100%	1.88E+03	4.00E+03	Yes	4.20E+03	No	Yes	NA	No	NA	No	No	EN	--
Pyrene	ug/kg	9	11%	6.00E+01	6 00E+01	No	ND	--	No	6.10E+07	No	6 10E+07	No	No	<Tier I	No
Sodium	mg/kg	9	33%	1.18E+02	2.60E+02	Yes	3.53E+02	No	Yes	NA	No	NA	No	No	EN	--
Thallium	mg/kg	9	11%	5.74E-01	7 20E-01	No	ND	--	No	1.60E+02	No	1.60E+02	No	No	<Tier I	No
Toluene	ug/kg	9	11%	3 49E+00	5 40E+00	No	ND	--	No	6.50E+05	No	4.20E+04	No	No	<Tier I	No
Total PCBs	ug/kg	9	11%	8.40E+00	8.40E+00	No	ND	--	No	1.00E+03	No	1.00E+03	No	No	<Tier I	No
Vanadium	mg/kg	9	100%	2.52E+01	5.00E+01	No	5.80E+01	No	Yes	1.40E+04	No	1.40E+03	No	No	<Tier I	No
Zinc	mg/kg	9	100%	3.79E+02	1.80E+03	No	6.41E+02	Yes	No	6.10E+05	No	6.10E+04	No	No	<Tier I	No

F-24

Surface Soil Industrial TACO Screen
Fill Area G

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD TEQ	ug/kg	4	100%	3.05E-03	8.35E-03	No	1.24E-01	No	Yes	1.00E+00	No	1.00E+00	No	No	<Tier I	No
4,4'-DDT	ug/kg	4	75%	1.15E-01	1.60E-01	No	1 41E+01	No	Yes	1.70E+04	No	1.00E+05	No	No	<Tier I	No
Alpha Chlordane	ug/kg	4	50%	1.90E-01	2.60E-01	No	ND	--	No	4.00E+03	No	1.20E+04	No	No	<Tier I	No
Aluminum	mg/kg	4	100%	1.30E+04	1.50E+04	No	2.54E+04	No	Yes	1.00E+05	No	1.00E+05	No	No	<Tier I	No
Antimony	mg/kg	4	50%	6.85E-01	7.20E-01	No	3.80E+00	No	Yes	8.20E+02	No	8.20E+01	No	No	<Tier I	No
Arsenic	mg/kg	4	100%	7.19E+00	8.05E+00	No	1.91E+01	No	Yes	3.00E+00	Yes	6.10E+01	No	No	<BK	No
Barium	mg/kg	4	100%	1.17E+02	1.40E+02	No	3.63E+02	No	Yes	1.40E+05	No	1.40E+04	No	No	<Tier I	No
Beryllium	mg/kg	4	100%	5.69E-01	6.40E-01	No	1.51E+00	No	Yes	2.11E+03	No	4.08E+02	No	No	<Tier I	No
Cadmium	mg/kg	4	100%	2.60E-01	3.90E-01	No	8.65E+00	No	Yes	2.00E+03	No	2.00E+02	No	No	<Tier I	No
Calcium	mg/kg	4	100%	9.73E+03	1.40E+04	Yes	3.35E+04	No	Yes	NA	No	NA	No	No	EN	--
Chromium	mg/kg	4	100%	1.93E+01	2.20E+01	No	3 93E+01	No	Yes	4.20E+02	No	4.10E+03	No	No	<Tier I	No
Cobalt	mg/kg	4	100%	7.33E+00	8.60E+00	No	1.55E+01	No	Yes	1 20E+05	No	1.20E+04	No	No	<Tier I	No
Copper	mg/kg	4	100%	1.83E+02	2.90E+02	No	2.09E+02	Yes	No	8.20E+04	No	8.20E+03	No	No	<Tier I	No
delta-BHC	ug/kg	4	75%	1.03E-01	1.82E-01	No	ND	--	No	9.00E+02	No	2.10E+03	No	No	<Tier I	No
Dieldrin	ug/kg	4	25%	6.20E-02	6.20E-02	No	ND	--	No	4.00E+02	No	3 10E+03	No	No	<Tier I	No
Endosulfan I	ug/kg	4	25%	2.20E-01	2.20E-01	No	ND	--	No	1 20E+07	No	1.20E+06	No	No	<Tier I	No
Endosulfan II	ug/kg	4	25%	3 40E-01	3.40E-01	No	ND	--	No	1 20E+07	No	1.20E+06	No	No	<Tier I	No
Endosulfan sulfate	ug/kg	4	50%	1.50E-01	1.80E-01	No	ND	--	No	1.20E+07	No	1.20E+06	No	No	<Tier I	No
Endrin	ug/kg	4	50%	1.48E-01	1.55E-01	No	ND	--	No	6.10E+05	No	6.10E+04	No	No	<Tier I	No
Endrin aldehyde	ug/kg	4	50%	3.95E-01	6.70E-01	No	ND	--	No	6 10E+05	No	6.10E+04	No	No	<Tier I	No
Endrin ketone	ug/kg	4	50%	9.10E-01	1.03E+00	No	ND	--	No	6 10E+05	No	6.10E+04	No	No	<Tier I	No
Gamma Chlordane	ug/kg	4	75%	2.02E-01	3.10E-01	No	ND	--	No	4.00E+03	No	1.20E+04	No	No	<Tier I	No
Heptachlor epoxide	ug/kg	4	25%	2.20E-01	2.20E-01	No	ND	--	No	6.00E+02	No	2.70E+03	No	No	<Tier I	No
Iron	mg/kg	4	100%	1.84E+04	2.00E+04	Yes	3.80E+04	No	Yes	NA	No	NA	No	No	EN	--
Lead	mg/kg	4	100%	1.36E+01	1.60E+01	No	1.85E+02	No	Yes	7.50E+02	No	7.50E+02	No	No	<Tier I	No
Magnesium	mg/kg	4	100%	4.09E+03	4.95E+03	Yes	1.72E+04	No	Yes	NA	No	NA	No	No	EN	--
Manganese	mg/kg	4	100%	5.44E+02	7.40E+02	No	8.83E+02	No	Yes	9.10E+04	No	8.70E+03	No	No	<Tier I	No
Mercury	mg/kg	4	100%	2.45E-02	2 90E-02	No	1 77E-01	No	Yes	6.10E+02	No	6.10E+01	No	No	<Tier I	No
Methoxychlor	ug/kg	4	25%	9.40E-01	9.40E-01	No	ND	--	No	1.00E+07	No	1.00E+06	No	No	<Tier I	No
Molybdenum	mg/kg	4	100%	5.19E-01	7.80E-01	No	2.02E+00	No	Yes	1 00E+04	No	1.00E+04	No	No	<Tier I	No
Nickel	mg/kg	4	100%	1.89E+01	2.15E+01	No	4.27E+01	No	Yes	2.10E+04	No	4.10E+03	No	No	<Tier I	No
Potassium	mg/kg	4	100%	1.45E+03	1 70E+03	Yes	4 73E+03	No	Yes	NA	No	NA	No	No	EN	--
Total PCBs	ug/kg	4	50%	1.81E+01	4.65E+01	No	See notes	--	No	1.00E+03	No	1.00E+03	No	No	<Tier I	No
Vanadium	mg/kg	4	100%	3 58E+01	4.00E+01	No	6.90E+01	No	Yes	1 40E+04	No	1 40E+03	No	No	<Tier I	No
Zinc	mg/kg	4	100%	6.09E+01	6.95E+01	No	8 08E+02	No	Yes	6.10E+05	No	6.10E+04	No	No	<Tier I	No

Surface Soil Industrial TACO Screen
Fill Area H

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD TEQ	ug/kg	4	100%	5.33E-01	1.29E+00	No	1.24E-01	Yes	No	1.00E+00	Yes	1.00E+00	Yes	Yes	>Tier I	No
2,4-DB	ug/kg	4	50%	6.74E+00	9.70E+00	No	ND	--	No	7.00E+06	No	7.00E+06	No	No	<Tier I	No
2-Hexanone	ug/kg	4	25%	5.70E+00	5.70E+00	No	3.30E+01	No	Yes	2.90E+06	No	2.90E+06	No	No	<Tier I	No
4,4'-DDE	ug/kg	4	75%	3.44E+01	8.60E+01	No	1.61E+01	Yes	No	1.70E+04	No	3.70E+05	No	No	<Tier I	No
4,4'-DDT	ug/kg	4	75%	4.51E+01	1.10E+02	No	1.41E+01	Yes	No	1.70E+04	No	1.00E+05	No	No	<Tier I	No
Aldrin	ug/kg	4	50%	8.21E+00	2.10E+01	No	ND	--	No	3.00E+02	No	6.10E+03	No	No	<Tier I	No
Aluminum	mg/kg	4	100%	7.95E+03	1.40E+04	No	2.54E+04	No	Yes	1.00E+05	No	1.00E+05	No	No	<Tier I	No
Antimony	mg/kg	4	100%	1.57E+00	2.30E+00	No	3.80E+00	No	Yes	8.20E+02	No	8.20E+01	No	No	<Tier I	No
Arsenic	mg/kg	4	100%	2.28E+01	6.40E+01	No	1.91E+01	Yes	No	3.00E+00	Yes	6.10E+01	Yes	Yes	>Tier I	No
Barium	mg/kg	4	100%	1.12E+02	1.20E+02	No	3.63E+02	No	Yes	1.40E+05	No	1.40E+04	No	No	<Tier I	No
Benzo(a)anthracene	ug/kg	4	75%	1.04E+02	1.30E+02	No	2.40E+02	No	Yes	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(a)pyrene	ug/kg	4	75%	9.93E+01	1.40E+02	No	1.87E+02	No	Yes	8.00E+02	No	1.70E+04	No	No	<Tier I	No
Benzo(b)fluoranthene	ug/kg	4	75%	1.13E+02	1.40E+02	No	1.79E+02	No	Yes	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(g,h,i)perylene	ug/kg	4	25%	1.61E+02	3.70E+02	No	1.27E+02	Yes	No	6.10E+07	No	6.10E+07	No	No	<Tier I	No
Benzo(k)fluoranthene	ug/kg	4	75%	9.68E+01	1.30E+02	No	2.08E+02	No	Yes	7.80E+04	No	1.70E+06	No	No	<Tier I	No
Beryllium	mg/kg	4	100%	1.52E+00	3.80E+00	No	1.51E+00	Yes	No	2.11E+03	No	4.08E+02	No	No	<Tier I	No
bis(2-Ethylhexyl)phthalate	ug/kg	4	50%	1.04E+02	1.20E+02	No	3.22E+02	No	Yes	4.10E+05	No	4.10E+06	No	No	<Tier I	No
Cadmium	mg/kg	4	100%	9.03E+00	2.20E+01	No	8.65E+00	Yes	No	2.00E+03	No	2.00E+02	No	No	<Tier I	No
Calcium	mg/kg	4	100%	1.76E+04	4.20E+04	Yes	3.35E+04	Yes	Yes	NA	No	NA	No	No	EN	--
Carbon disulfide	ug/kg	4	25%	3.42E+00	4.30E+00	No	ND	--	No	7.20E+05	No	9.00E+03	No	No	<Tier I	No
Chromium	mg/kg	4	100%	1.95E+01	2.30E+01	No	3.93E+01	No	Yes	4.20E+02	No	4.10E+03	No	No	<Tier I	No
Chrysene	ug/kg	4	75%	1.58E+02	3.00E+02	No	2.73E+02	Yes	No	7.80E+05	No	1.70E+07	No	No	<Tier I	No
Cobalt	mg/kg	4	100%	1.00E+01	2.00E+01	No	1.55E+01	Yes	No	1.20E+05	No	1.20E+04	No	No	<Tier I	No
Copper	mg/kg	4	100%	3.75E+02	4.60E+02	No	2.09E+02	Yes	No	8.20E+04	No	8.20E+03	No	No	<Tier I	No
Endosulfan II	ug/kg	4	25%	3.57E+00	7.20E+00	No	ND	--	No	1.20E+07	No	1.20E+06	No	No	<Tier I	No
Endrin ketone	ug/kg	4	75%	2.50E+01	8.20E+01	No	ND	--	No	6.10E+05	No	6.10E+04	No	No	<Tier I	No
Fluoranthene	ug/kg	4	75%	1.70E+02	2.40E+02	No	5.02E+02	No	Yes	8.20E+07	No	8.20E+07	No	No	<Tier I	No
Gamma Chlordane	ug/kg	4	50%	1.47E+01	3.00E+01	No	ND	--	No	4.00E+03	No	1.20E+04	No	No	<Tier I	No
Heptachlor	ug/kg	4	25%	1.28E+00	2.00E+00	No	ND	--	No	1.00E+03	No	1.60E+04	No	No	<Tier I	No
Heptachlor epoxide	ug/kg	4	75%	1.64E+01	4.40E+01	No	ND	--	No	6.00E+02	No	2.70E+03	No	No	<Tier I	No
Indeno(1,2,3-cd)pyrene	ug/kg	4	50%	9.18E+01	1.00E+02	No	ND	--	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Iron	mg/kg	4	100%	1.63E+04	1.80E+04	Yes	3.80E+04	No	Yes	NA	No	NA	No	No	EN	--
Lead	mg/kg	4	100%	1.46E+02	2.30E+02	No	1.85E+02	Yes	No	7.50E+02	No	7.50E+02	No	No	<Tier I	No
Magnesium	mg/kg	4	100%	2.02E+03	2.50E+03	Yes	1.72E+04	No	Yes	NA	No	NA	No	No	EN	--
Manganese	mg/kg	4	100%	4.37E+02	7.20E+02	No	8.83E+02	No	Yes	9.10E+04	No	8.70E+03	No	No	<Tier I	No
Mercury	mg/kg	4	100%	2.84E-01	7.70E-01	No	1.77E-01	Yes	No	6.10E+02	No	6.10E+01	No	No	<Tier I	No
Methoxychlor	ug/kg	4	50%	4.54E+01	1.30E+02	No	ND	--	No	1.00E+07	No	1.00E+06	No	No	<Tier I	No
Molybdenum	mg/kg	4	100%	4.95E+00	1.10E+01	No	2.02E+00	Yes	No	1.00E+04	No	1.00E+04	No	No	<Tier I	No
Nickel	mg/kg	4	100%	3.40E+01	7.00E+01	No	4.27E+01	Yes	No	2.10E+04	No	4.10E+03	No	No	<Tier I	No
Pentachlorophenol	ug/kg	4	25%	2.32E+02	2.41E+02	No	See notes	--	No	2.40E+04	No	5.20E+05	No	No	<Tier I	No
Phenanthrene	ug/kg	4	25%	9.63E+01	1.10E+02	No	3.35E+02	No	Yes	6.10E+08	No	6.10E+08	No	No	<Tier I	No
Potassium	mg/kg	4	100%	1.16E+03	1.60E+03	Yes	4.73E+03	No	Yes	NA	No	NA	No	No	EN	--
Pyrene	ug/kg	4	75%	1.58E+02	1.90E+02	No	4.35E+02	No	Yes	6.10E+07	No	6.10E+07	No	No	<Tier I	No
Selenium	mg/kg	4	75%	1.58E+00	4.70E+00	No	ND	--	No	1.00E+04	No	1.00E+03	No	No	<Tier I	No
Silver	mg/kg	4	75%	1.39E+00	2.70E+00	No	1.35E+00	Yes	No	1.00E+04	No	1.00E+03	No	No	<Tier I	No
Sodium	mg/kg	4	100%	2.48E+02	3.90E+02	Yes	5.77E+02	No	Yes	NA	No	NA	No	No	EN	--
Tetrachloroethene	ug/kg	4	25%	6.73E+00	1.70E+01	No	ND	--	No	2.00E+04	No	2.80E+04	No	No	<Tier I	No
Thallium	mg/kg	4	25%	1.01E+00	2.50E+00	No	ND	--	No	1.60E+02	No	1.60E+02	No	No	<Tier I	No
Total PCBs	ug/kg	4	75%	6.60E+02	1.52E+03	No	See notes	--	No	1.00E+03	Yes	1.00E+03	Yes	Yes	>Tier I	No
Vanadium	mg/kg	4	100%	3.00E+01	4.50E+01	No	6.90E+01	No	Yes	1.40E+04	No	1.40E+03	No	No	<Tier I	No
Zinc	mg/kg	4	100%	1.28E+03	3.60E+03	No	8.08E+02	Yes	No	6.10E+05	No	6.10E+04	No	No	<Tier I	No

F-26

Surface Soil Industrial TACO Screen
Fill Area I

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
1,2,4-Trichlorobenzene	ug/kg	4	25%	1.11E+02	1.80E+02	No	ND	--	No	3.20E+06	No	9.20E+05	No	No	<Tier I	No
1,4-Dichlorobenzene	ug/kg	4	25%	4.60E+01	4.60E+01	No	ND	--	No	1.70E+07	No	3.40E+05	No	No	<Tier I	No
Total 2,3,7,8-TCDD TEQ	ug/kg	4	100%	3.34E+00	1.27E+01	No	1.24E-01	Yes	No	1.00E+00	Yes	1.00E+00	Yes	Yes	>Tier I	No
2,4-DB	ug/kg	4	25%	1.27E+01	2.91E+01	No	ND	--	No	7.00E+06	No	7.00E+06	No	No	<Tier I	No
2,4-Dichlorophenol	ug/kg	4	25%	8.20E+01	8.20E+01	No	ND	--	No	6.10E+06	No	6.10E+05	No	No	<Tier I	No
2-Nitroaniline	ug/kg	4	25%	1.60E+02	1.60E+02	No	ND	--	No	5.00E+04	No	5.00E+04	No	No	<Tier I	No
4,4'-DDD	ug/kg	3	100%	6.69E+01	2.00E+02	No	ND	--	No	2.40E+04	No	5.20E+05	No	No	<Tier I	No
4,4'-DDE	ug/kg	3	100%	1.03E+02	3.00E+02	No	1.61E+01	Yes	No	1.70E+04	No	3.70E+05	No	No	<Tier I	No
4,4'-DDT	ug/kg	3	67%	1.57E+02	4.60E+02	No	1.41E+01	Yes	No	1.70E+04	No	1.00E+05	No	No	<Tier I	No
4-Chloroaniline	ug/kg	4	50%	4.64E+03	1.80E+04	No	ND	--	No	8.20E+06	No	8.20E+05	No	No	<Tier I	No
Aldrin	ug/kg	3	100%	8.48E+01	2.50E+02	No	ND	--	No	3.00E+02	No	6.10E+03	No	No	<Tier I	No
Alpha Chlordane	ug/kg	3	33%	2.65E+00	2.65E+00	No	ND	--	No	4.00E+03	No	1.20E+04	No	No	<Tier I	No
Aluminum	mg/kg	4	100%	5.64E+03	8.00E+03	No	2.54E+04	No	Yes	1.00E+05	No	1.00E+05	No	No	<Tier I	No
Anthracene	ug/kg	4	50%	2.36E+02	7.30E+02	No	1.60E+02	Yes	No	6.10E+08	No	6.10E+08	No	No	<Tier I	No
Antimony	mg/kg	4	100%	6.06E+00	8.40E+00	No	3.80E+00	Yes	No	8.20E+02	No	8.20E+01	No	No	<Tier I	No
Arsenic	mg/kg	4	100%	7.79E+00	1.20E+01	No	1.91E+01	No	Yes	3.00E+00	Yes	6.10E+01	No	No	<BK	No
Barium	mg/kg	4	100%	2.81E+02	7.40E+02	No	3.63E+02	Yes	No	1.40E+05	No	1.40E+04	No	No	<Tier I	No
Benzo(a)anthracene	ug/kg	4	75%	6.53E+02	2.20E+03	No	2.40E+02	Yes	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(a)pyrene	ug/kg	4	75%	6.29E+02	2.20E+03	No	1.87E+02	Yes	No	8.00E+02	Yes	1.70E+04	No	Yes	>DCind	No
Benzo(b)fluoranthene	ug/kg	4	75%	8.14E+02	2.80E+03	No	1.79E+02	Yes	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(g,h,i)perylene	ug/kg	4	75%	4.86E+02	1.60E+03	No	1.27E+02	Yes	No	6.10E+07	No	6.10E+07	No	No	<Tier I	No
Benzo(k)fluoranthene	ug/kg	4	75%	3.10E+02	9.60E+02	No	2.08E+02	Yes	No	7.80E+04	No	1.70E+06	No	No	<Tier I	No
Beryllium	mg/kg	4	100%	9.10E-01	1.70E+00	No	1.51E+00	Yes	No	2.11E+03	No	4.08E+02	No	No	<Tier I	No
bis(2-Ethylhexyl)phthalate	ug/kg	4	25%	8.75E+01	8.75E+01	No	3.22E+02	No	Yes	4.10E+05	No	4.10E+06	No	No	<Tier I	No
Cadmium	mg/kg	4	100%	1.12E+01	3.10E+01	No	8.65E+00	Yes	No	2.00E+03	No	2.00E+02	No	No	<Tier I	No
Calcium	mg/kg	4	100%	1.57E+05	2.35E+05	Yes	3.35E+04	Yes	Yes	NA	No	NA	No	No	EN	--
Carbazole	ug/kg	4	25%	1.48E+02	3.20E+02	No	6.40E+01	Yes	No	2.90E+05	No	6.20E+06	No	No	<Tier I	No
Chromium	mg/kg	4	100%	3.33E+01	6.50E+01	No	3.93E+01	Yes	No	4.20E+02	No	4.10E+03	No	No	<Tier I	No
Chrysene	ug/kg	4	75%	6.62E+02	2.20E+03	No	2.73E+02	Yes	No	7.80E+05	No	1.70E+07	No	No	<Tier I	No
Cobalt	mg/kg	4	100%	1.21E+01	3.30E+01	No	1.55E+01	Yes	No	1.20E+05	No	1.20E+04	No	No	<Tier I	No
Copper	mg/kg	4	100%	6.66E+03	1.30E+04	No	2.09E+02	Yes	No	8.20E+04	No	8.20E+03	Yes	Yes	>DCcw	No
Dibenzo(a,h)anthracene	ug/kg	4	50%	1.23E+02	3.60E+02	No	ND	--	No	8.00E+02	No	1.70E+04	No	No	<Tier I	No
Dibenzofuran	ug/kg	4	25%	9.25E+01	1.00E+02	No	ND	--	No	5.10E+06	No	5.10E+06	No	No	<Tier I	No
Dieldrin	ug/kg	3	100%	7.04E+01	2.00E+02	No	ND	--	No	4.00E+02	No	3.10E+03	No	No	<Tier I	No
Di-n-butylphthalate	ug/kg	4	25%	5.20E+01	5.20E+01	No	3.12E+02	No	Yes	2.30E+06	No	2.30E+06	No	No	<Tier I	No
Endosulfan I	ug/kg	3	100%	8.88E+01	2.60E+02	No	ND	--	No	1.20E+07	No	1.20E+06	No	No	<Tier I	No
Endosulfan II	ug/kg	3	100%	2.06E+02	6.00E+02	No	ND	--	No	1.20E+07	No	1.20E+06	No	No	<Tier I	No
Endosulfan sulfate	ug/kg	3	33%	8.65E+00	8.60E+00	No	ND	--	No	1.20E+07	No	1.20E+06	No	No	<Tier I	No
Endrin	ug/kg	3	100%	8.22E+01	2.40E+02	No	ND	--	No	6.10E+05	No	6.10E+04	No	No	<Tier I	No
Endrin aldehyde	ug/kg	3	100%	5.15E+02	1.50E+03	No	ND	--	No	6.10E+05	No	6.10E+04	No	No	<Tier I	No
Endrin ketone	ug/kg	3	100%	2.42E+02	7.00E+02	No	ND	--	No	6.10E+05	No	6.10E+04	No	No	<Tier I	No
Fluoranthene	ug/kg	4	100%	1.66E+03	6.00E+03	No	5.02E+02	Yes	No	8.20E+07	No	8.20E+07	No	No	<Tier I	No
Fluorene	ug/kg	4	25%	1.25E+02	2.30E+02	No	ND	--	No	8.20E+07	No	8.20E+07	No	No	<Tier I	No
Gamma Chlordane	ug/kg	3	100%	1.32E+02	3.80E+02	No	ND	--	No	4.00E+03	No	1.20E+04	No	No	<Tier I	No
Heptachlor	ug/kg	3	67%	2.48E+01	6.90E+01	No	ND	--	No	1.00E+03	No	1.60E+04	No	No	<Tier I	No
Heptachlor epoxide	ug/kg	3	100%	4.85E+01	1.40E+02	No	ND	--	No	6.00E+02	No	2.70E+03	No	No	<Tier I	No
Hexachlorobenzene	ug/kg	4	25%	5.48E+01	1.10E+02	No	ND	--	No	1.80E+03	No	2.60E+03	No	No	<Tier I	No
Indeno(1,2,3-cd)pyrene	ug/kg	4	50%	4.84E+02	1.60E+03	No	ND	--	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Iron	mg/kg	4	100%	1.08E+04	1.60E+04	Yes	3.80E+04	No	Yes	NA	No	NA	No	No	EN	--

Surface Soil Industrial TACO Screen
Fill Area I

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Lead	mg/kg	4	100%	6.95E+02	1.50E+03	No	1.85E+02	Yes	No	7.50E+02	Yes	7.50E+02	Yes	No	Avg<Tier I	No
Magnesium	mg/kg	4	100%	1.24E+04	1.90E+04	Yes	1.72E+04	Yes	Yes	NA	No	NA	No	No	EN	--
Manganese	mg/kg	4	100%	2.03E+02	3.00E+02	No	8.83E+02	No	Yes	9.10E+04	No	8.70E+03	No	No	<Tier I	No
Mercury	mg/kg	4	100%	6.04E-01	2.00E+00	No	1.77E-01	Yes	No	6.10E+02	No	6.10E+01	No	No	<Tier I	No
Methoxychlor	ug/kg	3	100%	1.03E+03	3.00E+03	No	ND	--	No	1.00E+07	No	1.00E+06	No	No	<Tier I	No
Molybdenum	mg/kg	4	100%	5.86E+00	8.50E+00	No	2.02E+00	Yes	No	1.00E+04	No	1.00E+04	No	No	<Tier I	No
Nickel	mg/kg	4	100%	3.54E+01	6.50E+01	No	4.27E+01	Yes	No	2.10E+04	No	4.10E+03	No	No	<Tier I	No
Pentachlorophenol	ug/kg	4	100%	8.34E+02	1.65E+03	No	See notes	--	No	2.40E+04	No	5.20E+05	No	No	<Tier I	No
Phenanthrene	ug/kg	4	100%	8.80E+02	3.30E+03	No	3.35E+02	Yes	No	6.10E+08	No	6.10E+08	No	No	<Tier I	No
Potassium	mg/kg	4	100%	1.24E+03	1.50E+03	Yes	4.73E+03	No	Yes	NA	No	NA	No	No	EN	--
Pyrene	ug/kg	4	100%	1.35E+03	4.70E+03	No	4.35E+02	Yes	No	6.10E+07	No	6.10E+07	No	No	<Tier I	No
Selenium	mg/kg	4	75%	1.10E+00	1.60E+00	No	ND	--	No	1.00E+04	No	1.00E+03	No	No	<Tier I	No
Silver	mg/kg	4	100%	8.71E+00	1.90E+01	No	1.35E+00	Yes	No	1.00E+04	No	1.00E+03	No	No	<Tier I	No
Sodium	mg/kg	4	100%	6.35E+02	8.70E+02	Yes	5.77E+02	Yes	Yes	NA	No	NA	No	No	EN	--
Toluene	ug/kg	4	25%	2.89E+00	3.30E+00	No	ND	--	No	6.50E+05	No	4.20E+04	No	No	<Tier I	No
Total PCBs	ug/kg	4	75%	3.13E+04	1.21E+05	No	See notes	--	No	1.00E+03	Yes	1.00E+03	Yes	Yes	>Tier I	No
Vanadium	mg/kg	4	100%	1.87E+01	2.60E+01	No	6.90E+01	No	Yes	1.40E+04	No	1.40E+03	No	No	<Tier I	No
Zinc	mg/kg	4	100%	1.43E+03	2.80E+03	No	8.08E+02	Yes	No	6.10E+05	No	6.10E+04	No	No	<Tier I	No

Surface Soil Industrial TACO Screen
Fill Area L

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD TEQ	ug/kg	4	100%	3.60E-01	8.21E-01	No	1.24E-01	Yes	No	1.00E+00	No	1.00E+00	No	No	<Tier I	No
2-Methylnaphthalene	ug/kg	4	25%	1.04E+02	1.40E+02	No	ND	--	No	8.20E+07	No	8.20E+06	No	No	<Tier I	No
4,4'-DDE	ug/kg	4	75%	1.10E+01	2.00E+01	No	1.61E+01	Yes	No	1.70E+04	No	3.70E+05	No	No	<Tier I	No
4,4'-DDT	ug/kg	4	25%	8.95E+00	1.60E+01	No	1.41E+01	Yes	No	1.70E+04	No	1.00E+05	No	No	<Tier I	No
Acenaphthene	ug/kg	4	50%	4.81E+02	1.60E+03	No	ND	--	No	1.20E+08	No	1.20E+08	No	No	<Tier I	No
Aldrin	ug/kg	4	25%	3.83E+00	5.50E+00	No	ND	--	No	3.00E+02	No	6.10E+03	No	No	<Tier I	No
Aluminum	mg/kg	4	100%	5.75E+03	7.60E+03	No	2.54E+04	No	Yes	1.00E+05	No	1.00E+05	No	No	<Tier I	No
Anthracene	ug/kg	4	75%	1.05E+03	3.60E+03	No	1.60E+02	Yes	No	6.10E+08	No	6.10E+08	No	No	<Tier I	No
Antimony	mg/kg	4	100%	3.28E+00	5.40E+00	No	3.80E+00	Yes	No	8.20E+02	No	8.20E+01	No	No	<Tier I	No
Arsenic	mg/kg	4	100%	3.33E+01	3.70E+01	No	1.91E+01	Yes	No	3.00E+00	Yes	6.10E+01	No	Yes	>DCInd	No
Barium	mg/kg	4	100%	1.71E+02	2.50E+02	No	3.63E+02	No	Yes	1.40E+05	No	1.40E+04	No	No	<Tier I	No
Benzo(a)anthracene	ug/kg	4	75%	2.56E+03	7.80E+03	No	2.40E+02	Yes	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(a)pyrene	ug/kg	4	75%	2.30E+03	7.00E+03	No	1.87E+02	Yes	No	8.00E+02	Yes	1.70E+04	No	Yes	>DCInd	No
Benzo(b)fluoranthene	ug/kg	4	75%	2.19E+03	6.60E+03	No	1.79E+02	Yes	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(g,h,i)perylene	ug/kg	4	75%	1.33E+03	3.80E+03	No	1.27E+02	Yes	No	6.10E+07	No	6.10E+07	No	No	<Tier I	No
Benzo(k)fluoranthene	ug/kg	4	75%	2.29E+03	6.80E+03	No	2.08E+02	Yes	No	7.80E+04	No	1.70E+06	No	No	<Tier I	No
Beryllium	mg/kg	4	100%	1.48E+00	1.60E+00	No	1.51E+00	Yes	No	2.11E+03	No	4.08E+02	No	No	<Tier I	No
beta-BHC	ug/kg	4	25%	1.66E+00	3.70E+00	No	ND	--	No	9.00E+02	No	2.10E+03	No	No	<Tier I	No
bis(2-Ethylhexyl)phthalate	ug/kg	4	50%	1.90E+02	3.10E+02	No	3.22E+02	No	Yes	4.10E+05	No	4.10E+06	No	No	<Tier I	No
Cadmium	mg/kg	4	100%	5.60E+00	1.00E+01	No	8.65E+00	Yes	No	2.00E+03	No	2.00E+02	No	No	<Tier I	No
Calcium	mg/kg	4	100%	2.00E+04	2.90E+04	Yes	3.35E+04	No	Yes	NA	No	NA	No	No	EN	--
Carbazole	ug/kg	4	75%	4.80E+02	1.50E+03	No	6.40E+01	Yes	No	2.90E+05	No	6.20E+06	No	No	<Tier I	No
Chromium	mg/kg	4	100%	4.53E+01	7.90E+01	No	3.93E+01	Yes	No	4.20E+02	No	4.10E+03	No	No	<Tier I	No
Chrysene	ug/kg	4	75%	2.64E+03	7.80E+03	No	2.73E+02	Yes	No	7.80E+05	No	1.70E+07	No	No	<Tier I	No
Cobalt	mg/kg	4	100%	1.38E+01	1.70E+01	No	1.55E+01	Yes	No	1.20E+05	No	1.20E+04	No	No	<Tier I	No
Copper	mg/kg	4	100%	1.76E+03	4.70E+03	No	2.09E+02	Yes	No	8.20E+04	No	8.20E+03	No	No	<Tier I	No
Cyanide, Total	mg/kg	4	25%	6.05E-01	1.60E+00	No	ND	--	No	4.10E+04	No	4.10E+03	No	No	<Tier I	No
Dibenzo(a,h)anthracene	ug/kg	4	50%	4.55E+02	1.30E+03	No	ND	--	No	8.00E+02	Yes	1.70E+04	No	Yes	>DCInd	No
Dibenzofuran	ug/kg	4	25%	2.56E+02	7.50E+02	No	ND	--	No	5.10E+06	No	5.10E+06	No	No	<Tier I	No
Dieldrin	ug/kg	4	25%	7.83E+00	1.20E+01	No	ND	--	No	4.00E+02	No	3.10E+03	No	No	<Tier I	No
Endrin ketone	ug/kg	4	75%	1.23E+01	2.80E+01	No	ND	--	No	6.10E+05	No	6.10E+04	No	No	<Tier I	No
Fluoranthene	ug/kg	4	75%	5.77E+03	1.80E+04	No	5.02E+02	Yes	No	8.20E+07	No	8.20E+07	No	No	<Tier I	No
Fluorene	ug/kg	4	50%	4.21E+02	1.40E+03	No	ND	--	No	8.20E+07	No	8.20E+07	No	No	<Tier I	No
Gamma Chlordane	ug/kg	4	75%	1.15E+01	2.10E+01	No	ND	--	No	4.00E+03	No	1.20E+04	No	No	<Tier I	No
Heptachlor epoxide	ug/kg	4	75%	5.85E+00	9.20E+00	No	ND	--	No	6.00E+02	No	2.70E+03	No	No	<Tier I	No
Indeno(1,2,3-cd)pyrene	ug/kg	4	75%	1.58E+03	4.80E+03	No	ND	--	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Iron	mg/kg	4	100%	2.30E+04	3.20E+04	Yes	3.80E+04	No	Yes	NA	No	NA	No	No	EN	--
Lead	mg/kg	4	100%	3.69E+02	9.40E+02	No	1.85E+02	Yes	No	7.50E+02	Yes	7.50E+02	Yes	No	Avg<Tier I	No
Magnesium	mg/kg	4	100%	2.49E+03	4.20E+03	Yes	1.72E+04	No	Yes	NA	No	NA	No	No	EN	--
Manganese	mg/kg	4	100%	3.51E+02	8.50E+02	No	8.83E+02	No	Yes	9.10E+04	No	8.70E+03	No	No	<Tier I	No
Mercury	mg/kg	4	100%	3.22E-01	5.60E-01	No	1.77E-01	Yes	No	6.10E+02	No	6.10E+01	No	No	<Tier I	No
Methoxychlor	ug/kg	4	50%	2.63E+01	4.60E+01	No	ND	--	No	1.00E+07	No	1.00E+06	No	No	<Tier I	No
Molybdenum	mg/kg	4	100%	1.45E+01	2.30E+01	No	2.02E+00	Yes	No	1.00E+04	No	1.00E+04	No	No	<Tier I	No
Naphthalene	ug/kg	4	25%	1.49E+02	3.20E+02	No	ND	--	No	8.20E+07	No	8.20E+06	No	No	<Tier I	No
Nickel	mg/kg	4	100%	4.68E+01	5.50E+01	No	4.27E+01	Yes	No	2.10E+04	No	4.10E+03	No	No	<Tier I	No
Pentachlorophenol	ug/kg	4	25%	2.38E+02	2.40E+02	No	See notes	--	No	2.40E+04	No	5.20E+05	No	No	<Tier I	No
Phenanthrene	ug/kg	4	75%	3.62E+03	1.20E+04	No	3.35E+02	Yes	No	6.10E+08	No	6.10E+08	No	No	<Tier I	No
Potassium	mg/kg	4	100%	1.09E+03	1.70E+03	Yes	4.73E+03	No	Yes	NA	No	NA	No	No	EN	--
Pyrene	ug/kg	4	75%	4.27E+03	1.30E+04	No	4.35E+02	Yes	No	6.10E+07	No	6.10E+07	No	No	<Tier I	No

Surface Soil Industrial TACO Screen
Fill Area L

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Selenium	mg/kg	4	100%	3.08E+00	4.30E+00	No	ND	--	No	1.00E+04	No	1.00E+03	No	No	<Tier I	No
Silver	mg/kg	4	75%	8.13E-01	1.20E+00	No	1.35E+00	No	Yes	1.00E+04	No	1.00E+03	No	No	<Tier I	No
Sodium	mg/kg	4	100%	3.45E+02	5.40E+02	Yes	5.77E+02	No	Yes	NA	No	NA	No	No	EN	--
Thallium	mg/kg	4	100%	1.85E+00	2.10E+00	No	ND	--	No	1.60E+02	No	1.60E+02	No	No	<Tier I	No
Toluene	ug/kg	4	25%	6.08E+00	1.30E+01	No	ND	--	No	6.50E+05	No	4.20E+04	No	No	<Tier I	No
Total PCBs	ug/kg	4	50%	4.90E+02	1.17E+03	No	See notes	--	No	1.00E+03	Yes	1.00E+03	Yes	Yes	>Tier I	No
Vanadium	mg/kg	4	100%	4.43E+01	4.90E+01	No	6.90E+01	No	Yes	1.40E+04	No	1.40E+03	No	No	<Tier I	No
Zinc	mg/kg	4	100%	5.10E+02	8.70E+02	No	8.08E+02	Yes	No	6.10E+05	No	6.10E+04	No	No	<Tier I	No

Surface Soil Industrial TACO Screen
Fill Area N

Constituent	Units	Number of Samples Analyzed	FOD	Mean	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Industrial Direct Contact (DC) Concentration	Is Max>DC?	Taco Tier I Construction Worker Direct Contact (DC) Concentration	Is Max>DC?	COPC?	Reason	Is Avg>100x DC?
Total 2,3,7,8-TCDD TEQ	ug/kg	4	100%	9.76E-02	3.45E-01	No	1.24E-01	Yes	No	1.00E+00	No	1.00E+00	No	No	<Tier I	No
4,4'-DDT	ug/kg	4	25%	2.02E+00	2.70E+00	No	1.41E+01	No	Yes	1.70E+04	No	1.00E+05	No	No	<Tier I	No
Aldrin	ug/kg	4	25%	1.03E+00	1.28E+00	No	ND	--	No	3.00E+02	No	6.10E+03	No	No	<Tier I	No
Alpha Chlordane	ug/kg	4	25%	9.67E-01	1.10E+00	No	ND	--	No	4.00E+03	No	1.20E+04	No	No	<Tier I	No
Aluminum	mg/kg	4	100%	8.75E+03	1.10E+04	No	2.54E+04	No	Yes	1.00E+05	No	1.00E+05	No	No	<Tier I	No
Anthracene	ug/kg	4	75%	4.70E+01	5.80E+01	No	1.60E+02	No	Yes	6.10E+08	No	6.10E+08	No	No	<Tier I	No
Antimony	mg/kg	4	25%	7.10E-01	7.10E-01	No	3.80E+00	No	Yes	8.20E+02	No	8.20E+01	No	No	<Tier I	No
Arsenic	mg/kg	4	100%	6.33E+00	7.30E+00	No	1.91E+01	No	Yes	3.00E+00	Yes	6.10E+01	No	No	<BK	No
Barium	mg/kg	4	100%	5.93E+02	1.20E+03	No	3.63E+02	Yes	No	1.40E+05	No	1.40E+04	No	No	<Tier I	No
Benzo(a)anthracene	ug/kg	4	100%	1.68E+02	2.70E+02	No	2.40E+02	Yes	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(a)pyrene	ug/kg	4	100%	1.87E+02	3.30E+02	No	1.87E+02	Yes	No	8.00E+02	No	1.70E+04	No	No	<Tier I	No
Benzo(b)fluoranthene	ug/kg	4	100%	1.65E+02	3.20E+02	No	1.79E+02	Yes	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Benzo(g,h,i)perylene	ug/kg	4	25%	1.44E+02	3.00E+02	No	1.27E+02	Yes	No	6.10E+07	No	6.10E+07	No	No	<Tier I	No
Benzo(k)fluoranthene	ug/kg	4	100%	2.18E+02	3.60E+02	No	2.08E+02	Yes	No	7.80E+04	No	1.70E+06	No	No	<Tier I	No
beta-BHC	ug/kg	4	25%	2.93E-01	3.38E-01	No	ND	--	No	9.00E+02	No	2.10E+03	No	No	<Tier I	No
bis(2-Ethylhexyl)phthalate	ug/kg	4	25%	1.01E+02	1.30E+02	No	3.22E+02	No	Yes	4.10E+05	No	4.10E+06	No	No	<Tier I	No
Cadmium	mg/kg	4	100%	8.46E-01	1.50E+00	No	8.65E+00	No	Yes	2.00E+03	No	2.00E+02	No	No	<Tier I	No
Calcium	mg/kg	4	100%	5.73E+04	1.09E+05	Yes	3.35E+04	Yes	Yes	NA	No	NA	No	No	EN	--
Chromium	mg/kg	4	100%	1.65E+01	1.80E+01	No	3.93E+01	No	Yes	4.20E+02	No	4.10E+03	No	No	<Tier I	No
Chrysene	ug/kg	4	100%	2.00E+02	3.10E+02	No	2.73E+02	Yes	No	7.80E+05	No	1.70E+07	No	No	<Tier I	No
Cobalt	mg/kg	4	100%	5.84E+00	6.15E+00	No	1.55E+01	No	Yes	1.20E+05	No	1.20E+04	No	No	<Tier I	No
Copper	mg/kg	4	100%	5.01E+01	1.10E+02	No	2.09E+02	No	Yes	8.20E+04	No	8.20E+03	No	No	<Tier I	No
Dibenzo(a,h)anthracene	ug/kg	4	50%	7.25E+01	1.10E+02	No	ND	--	No	8.00E+02	No	1.70E+04	No	No	<Tier I	No
Dieldrin	ug/kg	4	25%	1.89E+00	2.13E+00	No	ND	--	No	4.00E+02	No	3.10E+03	No	No	<Tier I	No
Fluoranthene	ug/kg	4	100%	3.93E+02	6.10E+02	No	5.02E+02	Yes	No	8.20E+07	No	8.20E+07	No	No	<Tier I	No
Gamma Chlordane	ug/kg	4	25%	1.38E+00	1.85E+00	No	ND	--	No	4.00E+03	No	1.20E+04	No	No	<Tier I	No
Indeno(1,2,3-cd)pyrene	ug/kg	4	75%	1.44E+02	2.50E+02	No	ND	--	No	8.00E+03	No	1.70E+05	No	No	<Tier I	No
Iron	mg/kg	4	100%	1.43E+04	1.50E+04	Yes	3.80E+04	No	Yes	NA	No	NA	No	No	EN	--
Lead	mg/kg	4	100%	1.38E+02	4.10E+02	No	1.85E+02	Yes	No	7.50E+02	No	7.50E+02	No	No	<Tier I	No
Magnesium	mg/kg	4	100%	7.18E+03	1.15E+04	Yes	1.72E+04	No	Yes	NA	No	NA	No	No	EN	--
Manganese	mg/kg	4	100%	3.74E+02	4.10E+02	No	8.83E+02	No	Yes	9.10E+04	No	8.70E+03	No	No	<Tier I	No
Mercury	mg/kg	4	100%	6.78E-02	9.50E-02	No	1.77E-01	No	Yes	6.10E+02	No	6.10E+01	No	No	<Tier I	No
Methoxychlor	ug/kg	4	25%	2.08E+01	5.50E+01	No	ND	--	No	1.00E+07	No	1.00E+06	No	No	<Tier I	No
Molybdenum	mg/kg	4	100%	1.03E+00	1.45E+00	No	2.02E+00	No	Yes	1.00E+04	No	1.00E+04	No	No	<Tier I	No
Nickel	mg/kg	4	100%	1.61E+01	1.70E+01	No	4.27E+01	No	Yes	2.10E+04	No	4.10E+03	No	No	<Tier I	No
Pentachlorophenol	ug/kg	4	100%	3.07E+02	4.74E+02	No	See notes	--	No	2.40E+04	No	5.20E+05	No	No	<Tier I	No
Phenanthrene	ug/kg	4	100%	1.76E+02	2.60E+02	No	3.35E+02	No	Yes	6.10E+08	No	6.10E+08	No	No	<Tier I	No
Potassium	mg/kg	4	100%	1.40E+03	1.60E+03	Yes	4.73E+03	No	Yes	NA	No	NA	No	No	EN	--
Pyrene	ug/kg	4	100%	3.41E+02	5.50E+02	No	4.35E+02	Yes	No	6.10E+07	No	6.10E+07	No	No	<Tier I	No
Selenium	mg/kg	4	25%	5.69E-01	6.80E-01	No	ND	--	No	1.00E+04	No	1.00E+03	No	No	<Tier I	No
Total PCBs	ug/kg	4	25%	5.13E+01	1.78E+02	No	See notes	--	No	1.00E+03	No	1.00E+03	No	No	<Tier I	No
Vanadium	mg/kg	4	100%	2.38E+01	2.90E+01	No	6.90E+01	No	Yes	1.40E+04	No	1.40E+03	No	No	<Tier I	No
Zinc	mg/kg	4	100%	1.49E+02	2.50E+02	No	8.08E+02	No	Yes	6.10E+05	No	6.10E+04	No	No	<Tier I	No

APPENDIX G

COPC SELECTION FOR THE SOIL TO GROUNDWATER PATHWAY

APPENDIX G
COPC SELECTION FOR THE SOIL TO GROUNDWATER PATHWAY

This appendix presents the screening tables for identifying COPCs for the soil to groundwater pathway. COPCs for surface soil for each transect, for subsurface soil for each transect, and for surface soil for each fill area (excluding Fill Area M, which is included in the sediment removal action) are identified using the "Soil to Groundwater Standards" presented in Appendix C Table C-3. The screening tables present:

- The frequency of detection and the arithmetic mean and maximum detected concentrations as presented in Appendix B;
- An identification of essential nutrient status and comparison to background, as presented in Appendix D;
- Comparison to the TACO Tier 1 soil to groundwater screening values; and
- An identification of whether or not a constituent is selected as a COPC and the reason why or why not.

The screening tables are presented in the following order:

- Surface soil – Transect 1
- Surface soil – Transect 2
- Surface soil – Transect 3
- Surface soil – Transect 4
- Surface soil – Transect 5
- Surface soil – Transect 6
- Surface soil – Transect 7

- Subsurface soil – Transect 1
- Subsurface soil – Transect 2
- Subsurface soil – Transect 3
- Subsurface soil – Transect 4
- Subsurface soil – Transect 5
- Subsurface soil – Transect 6
- Subsurface soil – Transect 7

- Surface soil – Fill Area G
- Surface soil – Fill Area H
- Surface soil – Fill Area I
- Surface soil – Fill Area L
- Surface soil – Fill Area N

For metals and ionizable organics, the soil to groundwater pathway screening values are pH dependent. The screening conducted in the above tables used the lowest screening value available, regardless of pH. In Tables G-2, G-3 and G-4 that follow the tables listed above, constituents that failed the initial soil to groundwater screen for transect surface soil, transect subsurface soil, and fill area surface soil are then compared to area-specific pH-specific soil to groundwater pathway screening values, where available. Many of the initial COPCs were screened out based on this site-specific screening step.

The screening results are summarized in Section 3.3.1 of the text.

Surface Soil - Soil-to-Groundwater TACO Screen
Transect 1

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Total 2,3,7,8-TCDD TEQ	ug/kg	5	100%	6.16E-03	1.31E-02	No	ND	--	No	NA	No	No	NA
2,4-D	ug/kg	10	10%	3.60E+00	3.60E+00	No	ND	--	No	7.70E+03	No	No	<SGW
2-Butanone (MEK)	ug/kg	10	20%	1.81E+01	3.20E+01	No	ND	--	No	NA	No	No	NA
2-Hexanone	ug/kg	10	10%	6.60E+00	6.60E+00	No	3.30E+01	No	Yes	NA	No	No	<BK
4,4'-DDE	ug/kg	10	70%	3.04E-01	5.65E-01	No	1.61E+01	No	Yes	2.70E+05	No	No	<SGW
4,4'-DDT	ug/kg	10	50%	4.81E-01	9.33E-01	No	1.41E+01	No	Yes	1.60E+05	No	No	<SGW
Acetone	ug/kg	10	50%	1.79E+02	4.40E+02	No	ND	--	No	1.60E+04	No	No	<SGW
Aluminum	mg/kg	10	100%	9.89E+03	1.50E+04	No	2.54E+04	No	Yes	NA	No	No	<BK
Antimony	mg/kg	10	80%	1.84E+00	2.60E+00	No	3.80E+00	No	Yes	2.00E+01	No	No	<SGW
Arsenic	mg/kg	10	100%	8.10E+00	1.00E+01	No	1.91E+01	No	Yes	1.00E+02	No	No	<SGW
Barium	mg/kg	10	100%	1.83E+02	2.40E+02	No	3.63E+02	No	Yes	2.60E+02	No	No	<SGW
Benzene	ug/kg	10	10%	2.83E+00	3.00E+00	No	ND	--	No	1.70E+02	No	No	<SGW
Beryllium	mg/kg	10	100%	6.30E-01	9.40E-01	No	1.51E+00	No	Yes	1.40E+02	No	No	<SGW
bis(2-Ethylhexyl)phthalate	ug/kg	10	10%	1.05E+02	1.60E+02	No	3.22E+02	No	Yes	3.10E+07	No	No	<SGW
Cadmium	mg/kg	10	100%	2.74E+00	4.80E+00	No	8.65E+00	No	Yes	1.00E+01	No	No	<SGW
Calcium	mg/kg	10	100%	5.91E+03	8.70E+03	Yes	3.35E+04	No	Yes	NA	No	No	EN
Carbon disulfide	ug/kg	10	10%	2.50E+00	2.60E+00	No	ND	--	No	1.60E+05	No	No	<SGW
Chlorobenzene	ugkg	10	10%	3.03E+00	4.00E+00	No	ND	--	No	6.50E+03	No	No	<SGW
Chromium	mg/kg	10	100%	1.89E+01	4.90E+01	No	3.93E+01	Yes	No	NA	No	No	NA
Cobalt	mg/kg	10	100%	7.01E+00	9.20E+00	No	1.55E+01	No	Yes	NA	No	No	<BK
Copper	mg/kg	10	100%	1.32E+02	2.30E+02	No	2.09E+02	Yes	No	3.30E+02	No	No	<SGW
Dicamba	ug/kg	10	40%	3.06E+00	6.35E+00	No	ND	--	No	NA	No	No	NA
Dieldrin	ug/kg	10	30%	5.76E-01	1.50E+00	No	ND	--	No	2.00E+01	No	No	<SGW
Endosulfan sulfate	ug/kg	10	40%	2.61E-01	4.50E-01	No	ND	--	No	9.00E+04	No	No	<SGW
Endrin ketone	ug/kg	10	70%	2.66E-01	4.90E-01	No	ND	--	No	5.00E+03	No	No	<SGW
Fluoranthene	ug/kg	10	10%	6.60E+01	6.60E+01	No	5.02E+02	No	Yes	2.10E+07	No	No	<SGW
Heptachlor epoxide	ug/kg	10	60%	2.60E-01	5.07E-01	No	ND	--	No	3.30E+03	No	No	<SGW
Iron	mg/kg	10	100%	1.60E+04	2.20E+04	Yes	3.80E+04	No	Yes	NA	No	No	EN
Lead	mg/kg	10	100%	7.29E+01	1.20E+02	No	1.85E+02	No	Yes	NA	No	No	<BK
Magnesium	mg/kg	10	100%	4.40E+03	5.30E+03	Yes	1.72E+04	No	Yes	NA	No	No	EN
Manganese	mg/kg	10	100%	3.65E+02	5.50E+02	No	8.83E+02	No	Yes	NA	No	No	<BK
MCPA	ug/kg	10	40%	2.71E+03	7.40E+03	No	1.45E+04	No	Yes	NA	No	No	<BK
Mercury	mg/kg	10	100%	6.25E-02	9.90E-02	No	1.77E-01	No	Yes	5.00E-02	Yes	No	<BK
Methoxychlor	ug/kg	10	50%	2.06E+00	2.90E+00	No	ND	--	No	7.80E+05	No	No	<SGW
Methylene chloride (Dichlorome	ug/kg	10	20%	2.20E+00	2.40E+00	No	1.14E+01	No	Yes	2.00E+02	No	No	<SGW
Molybdenum	mg/kg	10	100%	5.03E-01	8.60E-01	No	2.02E+00	No	Yes	NA	No	No	<BK
Nickel	mg/kg	10	100%	1.95E+01	2.50E+01	No	4.27E+01	No	Yes	4.00E+02	No	No	<SGW
Pentachlorophenol	ug/kg	10	90%	2.96E+02	4.82E+02	No	See notes	--	No	1.00E+02	Yes	Yes	>SGW
Potassium	mg/kg	10	100%	2.00E+03	2.80E+03	Yes	4.73E+03	No	Yes	NA	No	No	EN

Surface Soil - Soil-to-Groundwater TACO Screen
Transect 1

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Selenium	mg/kg	10	20%	6.18E-01	8.10E-01	No	ND	--	No	2.40E+00	No	No	<SGW
Silver	mg/kg	10	90%	3.94E-01	5.90E-01	No	1.35E+00	No	Yes	NA	No	No	<BK
Thallium	mg/kg	10	40%	6.84E-01	9.80E-01	No	ND	--	No	1.60E+01	No	No	<SGW
Toluene	ug/kg	10	20%	2.84E+00	3.20E+00	No	ND	--	No	2.90E+04	No	No	<SGW
Total PCBs	ug/kg	10	100%	1.01E+02	2.31E+02	No	See notes	--	No	NA	No	No	NA
Trichloroethene	ug/kg	10	30%	3.52E+00	6.20E+00	No	ND	--	No	3.00E+02	No	No	<SGW
Vanadium	mg/kg	10	100%	2.84E+01	4.10E+01	No	6.90E+01	No	Yes	NA	No	No	<BK
Zinc	mg/kg	10	100%	3.88E+02	1.40E+03	No	8.08E+02	Yes	No	2.00E+03	No	No	<SGW

Surface Soil - Soil-to-Groundwater TACO Screen
Transect 2

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Total 2,3,7,8-TCDD TEQ	ug/kg	4	100%	5.87E-03	9.94E-03	No	ND	--	No	NA	No	No	NA
2-Butanone (MEK)	ug/kg	9	67%	2.19E+01	3.40E+01	No	ND	--	No	NA	No	No	NA
2-Hexanone	ug/kg	9	11%	4.80E+00	4.80E+00	No	3.30E+01	No	Yes	NA	No	No	<BK
4,4'-DDD	ug/kg	9	11%	5.60E-01	5.60E-01	No	ND	--	No	8.00E+04	No	No	<SGW
4,4'-DDE	ug/kg	9	33%	3.80E-01	4.80E-01	No	1.61E+01	No	Yes	2.70E+05	No	No	<SGW
4,4'-DDT	ug/kg	9	56%	2.62E+00	1.40E+01	No	1.41E+01	No	Yes	1.60E+05	No	No	<SGW
Acetone	ug/kg	9	67%	2.17E+02	4.50E+02	No	ND	--	No	1.60E+04	No	No	<SGW
Aluminum	mg/kg	9	100%	1.21E+04	1.80E+04	No	2.54E+04	No	Yes	NA	No	No	<BK
Antimony	mg/kg	9	67%	1.21E+00	1.70E+00	No	3.80E+00	No	Yes	2.00E+01	No	No	<SGW
Arsenic	mg/kg	9	100%	7.94E+00	1.00E+01	No	1.91E+01	No	Yes	1.00E+02	No	No	<SGW
Barium	mg/kg	9	100%	1.92E+02	2.30E+02	No	3.63E+02	No	Yes	2.60E+02	No	No	<SGW
Benzo(a)anthracene	ug/kg	9	22%	5.90E+01	7.20E+01	No	2.40E+02	No	Yes	8.00E+03	No	No	<SGW
Benzo(a)pyrene	ug/kg	9	22%	5.64E+01	7.20E+01	No	1.87E+02	No	Yes	8.20E+04	No	No	<SGW
Benzo(b)fluoranthene	ug/kg	9	33%	4.87E+01	7.20E+01	No	1.79E+02	No	Yes	2.50E+04	No	No	<SGW
Benzo(g,h,i)perylene	ug/kg	9	11%	4.00E+01	4.00E+01	No	1.27E+02	No	Yes	2.10E+07	No	No	<SGW
Benzo(k)fluoranthene	ug/kg	9	22%	5.80E+01	6.30E+01	No	2.08E+02	No	Yes	2.50E+05	No	No	<SGW
Beryllium	mg/kg	9	78%	6.82E-01	1.10E+00	No	1.51E+00	No	Yes	1.40E+02	No	No	<SGW
bis(2-Ethylhexyl)phthalate	ug/kg	9	33%	7.07E+01	9.40E+01	No	3.22E+02	No	Yes	3.10E+07	No	No	<SGW
Cadmium	mg/kg	9	100%	2.28E+00	2.80E+00	No	8.65E+00	No	Yes	1.00E+01	No	No	<SGW
Calcium	mg/kg	9	100%	8.18E+03	1.60E+04	Yes	3.35E+04	No	Yes	NA	No	No	EN
Chromium	mg/kg	9	100%	2.13E+01	4.80E+01	No	3.93E+01	Yes	No	NA	No	No	NA
Chrysene	ug/kg	9	33%	6.23E+01	8.90E+01	No	2.73E+02	No	Yes	8.00E+05	No	No	<SGW
Cobalt	mg/kg	9	100%	7.76E+00	1.10E+01	No	1.55E+01	No	Yes	NA	No	No	<BK
Copper	mg/kg	9	100%	9.02E+01	1.40E+02	No	2.09E+02	No	Yes	3.30E+02	No	No	<SGW
Dicamba	ug/kg	9	22%	2.20E+00	3.10E+00	No	ND	--	No	NA	No	No	NA
Dieldrin	ug/kg	9	11%	1.30E+00	1.30E+00	No	ND	--	No	2.00E+01	No	No	<SGW
Di-n-butylphthalate	ug/kg	9	11%	1.03E+02	1.20E+02	No	3.12E+02	No	Yes	2.30E+06	No	No	<SGW
Endosulfan sulfate	ug/kg	9	33%	3.30E-01	4.70E-01	No	ND	--	No	9.00E+04	No	No	<SGW
Endrin ketone	ug/kg	9	44%	5.95E-01	1.30E+00	No	ND	--	No	5.00E+03	No	No	<SGW
Fluoranthene	ug/kg	9	22%	1.08E+02	1.50E+02	No	5.02E+02	No	Yes	2.10E+07	No	No	<SGW
Gamma Chlordane	ug/kg	9	11%	2.00E-01	2.00E-01	No	ND	--	No	4.80E+04	No	No	<SGW
Heptachlor epoxide	ug/kg	9	22%	1.70E-01	1.90E-01	No	ND	--	No	3.30E+03	No	No	<SGW
Iron	mg/kg	9	100%	1.90E+04	2.50E+04	Yes	3.80E+04	No	Yes	NA	No	No	EN
Lead	mg/kg	9	100%	6.47E+01	8.80E+01	No	1.85E+02	No	Yes	NA	No	No	<BK
Magnesium	mg/kg	9	100%	5.16E+03	9.50E+03	Yes	1.72E+04	No	Yes	NA	No	No	EN
Manganese	mg/kg	9	100%	5.56E+02	1.20E+03	No	8.83E+02	Yes	No	NA	No	No	NA
MCPA	ug/kg	9	22%	1.75E+03	5.50E+03	No	1.45E+04	No	Yes	NA	No	No	<BK
MCPP	ug/kg	9	11%	1.91E+03	7.60E+03	No	9.97E+03	No	Yes	NA	No	No	<BK
Mercury	mg/kg	9	100%	6.91E-02	9.40E-02	No	1.77E-01	No	Yes	5.00E-02	Yes	No	<BK

Surface Soil - Soil-to-Groundwater TACO Screen
Transect 2

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Methoxychlor	ug/kg	9	22%	4.30E+00	7.30E+00	No	ND	--	No	7.80E+05	No	No	<SGW
Methylene chloride (Dichlorome	ug/kg	9	11%	2.00E+00	2.00E+00	No	1.14E+01	No	Yes	2.00E+02	No	No	<SGW
Molybdenum	mg/kg	9	100%	7.67E-01	1.30E+00	No	2.02E+00	No	Yes	NA	No	No	<BK
Nickel	mg/kg	9	100%	2.18E+01	2.70E+01	No	4.27E+01	No	Yes	4.00E+02	No	No	<SGW
Pentachlorophenol	ug/kg	9	44%	2.45E+02	2.51E+02	No	See notes	--	No	1.00E+02	Yes	Yes	>SGW
Phenanthrene	ug/kg	9	22%	5.65E+01	6.10E+01	No	3.35E+02	No	Yes	5.90E+07	No	No	<SGW
Potassium	mg/kg	9	100%	2.53E+03	3.80E+03	Yes	4.73E+03	No	Yes	NA	No	No	EN
Pyrene	ug/kg	9	22%	1.03E+02	1.20E+02	No	4.35E+02	No	Yes	2.10E+07	No	No	<SGW
Selenium	mg/kg	9	33%	6.01E-01	1.00E+00	No	ND	--	No	2.40E+00	No	No	<SGW
Silver	mg/kg	9	89%	3.44E-01	4.80E-01	No	1.35E+00	No	Yes	NA	No	No	<BK
Thallium	mg/kg	9	44%	7.21E-01	1.30E+00	No	ND	--	No	1.60E+01	No	No	<SGW
Toluene	ug/kg	9	11%	3.02E+00	3.40E+00	No	ND	--	No	2.90E+04	No	No	<SGW
Total PCBs	ug/kg	9	89%	6.68E+01	1.64E+02	No	See notes	--	No	NA	No	No	NA
Vanadium	mg/kg	9	100%	4.22E+01	1.20E+02	No	6.90E+01	Yes	No	NA	No	No	NA
Zinc	mg/kg	9	100%	2.46E+02	3.10E+02	No	8.08E+02	No	Yes	2.00E+03	No	No	<SGW

Surface Soil - Soil-to-Groundwater TACO Screen
Transect 3

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Total 2,3,7,8-TCDD TEQ	ug/kg	4	100%	3.07E-03	3.66E-03	No	ND	--	No	NA	No	No	NA
2,4-DB	ug/kg	10	10%	8.89E+00	4.10E+01	No	ND	--	No	NA	No	No	NA
2-Butanone (MEK)	ug/kg	10	60%	2.77E+01	4.70E+01	No	ND	--	No	NA	No	No	NA
2-Hexanone	ug/kg	10	10%	6.90E+00	6.90E+00	No	3.30E+01	No	Yes	NA	No	No	<BK
4,4'-DDE	ug/kg	10	50%	6.22E-01	1.70E+00	No	1.61E+01	No	Yes	2.70E+05	No	No	<SGW
4,4'-DDT	ug/kg	10	40%	1.21E+00	1.80E+00	No	1.41E+01	No	Yes	1.60E+05	No	No	<SGW
Acetone	ug/kg	10	60%	3.08E+02	6.70E+02	No	ND	--	No	1.60E+04	No	No	<SGW
Alpha Chlordane	ug/kg	10	20%	1.48E+00	5.80E+00	No	ND	--	No	4.80E+04	No	No	<SGW
Aluminum	mg/kg	10	100%	9.46E+03	1.70E+04	No	2.54E+04	No	Yes	NA	No	No	<BK
Anthracene	ug/kg	10	20%	3.85E+01	5.10E+01	No	1.60E+02	No	Yes	5.90E+07	No	No	<SGW
Antimony	mg/kg	10	40%	1.20E+00	1.90E+00	No	3.80E+00	No	Yes	2.00E+01	No	No	<SGW
Arsenic	mg/kg	10	100%	6.64E+00	9.70E+00	No	1.91E+01	No	Yes	1.00E+02	No	No	<SGW
Barium	mg/kg	10	100%	1.65E+02	2.20E+02	No	3.63E+02	No	Yes	2.60E+02	No	No	<SGW
Benzene	ug/kg	10	10%	2.10E+00	2.10E+00	No	ND	--	No	1.70E+02	No	No	<SGW
Benzo(a)anthracene	ug/kg	10	50%	1.20E+02	4.80E+02	No	2.40E+02	Yes	No	8.00E+03	No	No	<SGW
Benzo(a)pyrene	ug/kg	10	40%	1.37E+02	8.60E+02	No	1.87E+02	Yes	No	8.20E+04	No	No	<SGW
Benzo(b)fluoranthene	ug/kg	10	60%	1.64E+02	9.70E+02	No	1.79E+02	Yes	No	2.50E+04	No	No	<SGW
Benzo(g,h,i)perylene	ug/kg	10	50%	1.54E+02	8.30E+02	No	1.27E+02	Yes	No	2.10E+07	No	No	<SGW
Benzo(k)fluoranthene	ug/kg	10	40%	1.78E+02	1.00E+03	No	2.08E+02	Yes	No	2.50E+05	No	No	<SGW
Beryllium	mg/kg	10	90%	5.87E-01	1.10E+00	No	1.51E+00	No	Yes	1.40E+02	No	No	<SGW
beta-BHC	ug/kg	10	10%	3.38E-01	7.50E-01	No	ND	--	No	3.00E+00	No	No	<SGW
bis(2-Ethylhexyl)phthalate	ug/kg	10	40%	1.31E+02	4.30E+02	No	3.22E+02	Yes	No	3.10E+07	No	No	<SGW
Cadmium	mg/kg	10	100%	2.34E+00	3.80E+00	No	8.65E+00	No	Yes	1.00E+01	No	No	<SGW
Calcium	mg/kg	10	100%	3.27E+04	2.50E+05	Yes	3.35E+04	Yes	Yes	NA	No	No	EN
Carbazole	ug/kg	10	10%	8.80E+01	8.80E+01	No	6.40E+01	Yes	No	2.80E+03	No	No	<SGW
Chromium	mg/kg	10	100%	1.59E+01	2.30E+01	No	3.93E+01	No	Yes	NA	No	No	<BK
Chrysene	ug/kg	10	70%	1.63E+02	9.80E+02	No	2.73E+02	Yes	No	8.00E+05	No	No	<SGW
Cobalt	mg/kg	10	100%	6.50E+00	1.00E+01	No	1.55E+01	No	Yes	NA	No	No	<BK
Copper	mg/kg	10	100%	6.56E+01	7.90E+01	No	2.09E+02	No	Yes	3.30E+02	No	No	<SGW
Dibenzo(a,h)anthracene	ug/kg	10	10%	7.15E+01	2.50E+02	No	ND	--	No	7.60E+03	No	No	<SGW
Dicamba	ug/kg	10	20%	8.80E+00	2.30E+01	No	ND	--	No	NA	No	No	NA
Dieldrin	ug/kg	10	40%	9.28E-01	1.08E+00	No	ND	--	No	2.00E+01	No	No	<SGW
Endrin ketone	ug/kg	10	20%	4.60E-01	7.50E-01	No	ND	--	No	5.00E+03	No	No	<SGW
Fluoranthene	ug/kg	10	60%	2.49E+02	1.50E+03	No	5.02E+02	Yes	No	2.10E+07	No	No	<SGW
Gamma Chlordane	ug/kg	10	30%	1.40E+00	5.10E+00	No	ND	--	No	4.80E+04	No	No	<SGW
Indeno(1,2,3-cd)pyrene	ug/kg	10	10%	1.59E+02	6.90E+02	No	ND	--	No	6.90E+04	No	No	<SGW
Iron	mg/kg	10	100%	1.45E+04	2.20E+04	Yes	3.80E+04	No	Yes	NA	No	No	EN
Lead	mg/kg	10	100%	5.45E+01	9.00E+01	No	1.85E+02	No	Yes	NA	No	No	<BK
Magnesium	mg/kg	10	100%	6.25E+03	1.80E+04	Yes	1.72E+04	Yes	Yes	NA	No	No	EN

Surface Soil - Soil-to-Groundwater TACO Screen
Transect 3

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Manganese	mg/kg	10	100%	3.79E+02	6.10E+02	No	8.83E+02	No	Yes	NA	No	No	<BK
MCPA	ug/kg	10	20%	1.54E+03	4.00E+03	No	1.45E+04	No	Yes	NA	No	No	<BK
MCPP	ug/kg	10	20%	2.25E+03	7.70E+03	No	9.97E+03	No	Yes	NA	No	No	<BK
Mercury	mg/kg	10	100%	6.27E-02	9.30E-02	No	1.77E-01	No	Yes	5.00E-02	Yes	No	<BK
Methoxychlor	ug/kg	10	10%	2.60E+00	2.60E+00	No	ND	--	No	7.80E+05	No	No	<SGW
Molybdenum	mg/kg	10	100%	7.38E-01	1.40E+00	No	2.02E+00	No	Yes	NA	No	No	<BK
Nickel	mg/kg	10	100%	1.86E+01	2.60E+01	No	4.27E+01	No	Yes	4.00E+02	No	No	<SGW
Pentachlorophenol	ug/kg	10	20%	2.97E+02	7.40E+02	No	See notes	--	No	1.00E+02	Yes	Yes	>SGW
Phenanthrene	ug/kg	10	40%	1.33E+02	5.30E+02	No	3.35E+02	Yes	No	5.90E+07	No	No	<SGW
Potassium	mg/kg	10	100%	2.18E+03	3.70E+03	Yes	4.73E+03	No	Yes	NA	No	No	EN
Pyrene	ug/kg	10	30%	2.39E+02	1.40E+03	No	4.35E+02	Yes	No	2.10E+07	No	No	<SGW
Selenium	mg/kg	10	20%	8.30E-01	3.20E+00	No	ND	--	No	2.40E+00	Yes	Yes	>SGW
Silver	mg/kg	10	40%	2.98E-01	3.80E-01	No	1.35E+00	No	Yes	NA	No	No	<BK
Thallium	mg/kg	10	30%	6.93E-01	1.40E+00	No	ND	--	No	1.60E+01	No	No	<SGW
Toluene	ug/kg	10	30%	3.17E+00	5.30E+00	No	ND	--	No	2.90E+04	No	No	<SGW
Total PCBs	ug/kg	10	90%	6.29E+01	1.16E+02	No	See notes	--	No	NA	No	No	NA
Vanadium	mg/kg	10	100%	2.68E+01	4.20E+01	No	6.90E+01	No	Yes	NA	No	No	<BK
Zinc	mg/kg	10	100%	2.70E+02	4.60E+02	No	8.08E+02	No	Yes	2.00E+03	No	No	<SGW

G-9

Surface Soil - Soil-to-Groundwater TACO Screen
Transect 4

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Total 2,3,7,8-TCDD TEQ	ug/kg	5	100%	4.71E-03	7.42E-03	No	ND	--	No	NA	No	No	NA
2,4-DB	ug/kg	10	10%	7.68E+00	3.50E+01	No	ND	--	No	NA	No	No	NA
2-Butanone (MEK)	ug/kg	10	10%	1.50E+01	2.45E+01	No	ND	--	No	NA	No	No	NA
2-Methylnaphthalene	ug/kg	10	20%	6.68E+01	7.20E+01	No	ND	--	No	4.20E+05	No	No	<SGW
4,4'-DDE	ug/kg	10	40%	1.08E+00	1.50E+00	No	1.61E+01	No	Yes	2.70E+05	No	No	<SGW
4,4'-DDT	ug/kg	10	50%	1.74E+00	3.00E+00	No	1.41E+01	No	Yes	1.60E+05	No	No	<SGW
Acenaphthene	ug/kg	10	50%	2.11E+02	1.20E+03	No	ND	--	No	2.90E+06	No	No	<SGW
Acenaphthylene	ug/kg	10	30%	4.93E+01	7.50E+01	No	ND	--	No	2.90E+06	No	No	<SGW
Acetone	ug/kg	10	20%	9.68E+01	4.60E+02	No	ND	--	No	1.60E+04	No	No	<SGW
Alpha Chlordane	ug/kg	10	40%	1.32E+00	3.10E+00	No	ND	--	No	4.80E+04	No	No	<SGW
Aluminum	mg/kg	10	100%	9.40E+03	1.40E+04	No	2.54E+04	No	Yes	NA	No	No	<BK
Anthracene	ug/kg	10	60%	3.65E+02	2.30E+03	No	1.60E+02	Yes	No	5.90E+07	No	No	<SGW
Antimony	mg/kg	10	10%	6.50E-01	6.50E-01	No	3.80E+00	No	Yes	2.00E+01	No	No	<SGW
Arsenic	mg/kg	10	100%	6.76E+00	1.00E+01	No	1.91E+01	No	Yes	1.00E+02	No	No	<SGW
Barium	mg/kg	10	100%	2.65E+02	1.20E+03	No	3.63E+02	Yes	No	2.60E+02	Yes	Yes	>SGW
Benzo(a)anthracene	ug/kg	10	80%	7.03E+02	4.30E+03	No	2.40E+02	Yes	No	8.00E+03	No	No	<SGW
Benzo(a)pyrene	ug/kg	10	50%	5.91E+02	3.50E+03	No	1.87E+02	Yes	No	8.20E+04	No	No	<SGW
Benzo(b)fluoranthene	ug/kg	10	50%	5.98E+02	3.50E+03	No	1.79E+02	Yes	No	2.50E+04	No	No	<SGW
Benzo(g,h,i)perylene	ug/kg	10	40%	3.93E+02	2.20E+03	No	1.27E+02	Yes	No	2.10E+07	No	No	<SGW
Benzo(k)fluoranthene	ug/kg	10	50%	5.42E+02	3.30E+03	No	2.08E+02	Yes	No	2.50E+05	No	No	<SGW
Beryllium	mg/kg	10	100%	5.83E-01	8.60E-01	No	1.51E+00	No	Yes	1.40E+02	No	No	<SGW
beta-BHC	ug/kg	10	40%	4.41E-01	1.30E+00	No	ND	--	No	3.00E+00	No	No	<SGW
bis(2-Ethylhexyl)phthalate	ug/kg	10	10%	6.60E+01	6.60E+01	No	3.22E+02	No	Yes	3.10E+07	No	No	<SGW
Cadmium	mg/kg	10	100%	1.62E+00	3.20E+00	No	8.65E+00	No	Yes	1.00E+01	No	No	<SGW
Calcium	mg/kg	10	100%	5.13E+04	1.50E+05	Yes	3.35E+04	Yes	Yes	NA	No	No	EN
Carbazole	ug/kg	10	50%	1.88E+02	1.00E+03	No	6.40E+01	Yes	No	2.80E+03	No	No	<SGW
Chromium	mg/kg	10	100%	1.76E+01	2.90E+01	No	3.93E+01	No	Yes	NA	No	No	<BK
Chrysene	ug/kg	10	90%	7.10E+02	4.40E+03	No	2.73E+02	Yes	No	8.00E+05	No	No	<SGW
Cobalt	mg/kg	10	100%	6.40E+00	1.00E+01	No	1.55E+01	No	Yes	NA	No	No	<BK
Copper	mg/kg	10	100%	6.51E+01	1.80E+02	No	2.09E+02	No	Yes	3.30E+02	No	No	<SGW
delta-BHC	ug/kg	10	40%	1.64E-01	2.40E-01	No	ND	--	No	3.00E+00	No	No	<SGW
Dibenzo(a,h)anthracene	ug/kg	10	10%	1.31E+02	8.10E+02	No	ND	--	No	7.60E+03	No	No	<SGW
Dibenzofuran	ug/kg	10	30%	1.63E+02	7.70E+02	No	ND	--	No	NA	No	No	NA
Dicamba	ug/kg	10	20%	1.63E+00	1.75E+00	No	ND	--	No	NA	No	No	NA
Dieldrin	ug/kg	10	60%	2.84E+00	1.00E+01	No	ND	--	No	2.00E+01	No	No	<SGW
Endosulfan sulfate	ug/kg	10	20%	1.20E-01	1.40E-01	No	ND	--	No	9.00E+04	No	No	<SGW
Endrin ketone	ug/kg	10	40%	1.90E+00	4.00E+00	No	ND	--	No	5.00E+03	No	No	<SGW
Fluoranthene	ug/kg	10	90%	1.58E+03	1.00E+04	No	5.02E+02	Yes	No	2.10E+07	No	No	<SGW
Fluorene	ug/kg	10	40%	2.33E+02	1.40E+03	No	ND	--	No	2.80E+06	No	No	<SGW

Surface Soil - Soil-to-Groundwater TACO Screen
Transect 4

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Gamma Chlordane	ug/kg	10	40%	1.83E+00	6.60E+00	No	ND	--	No	4.80E+04	No	No	<SGW
Heptachlor	ug/kg	10	20%	4.90E-01	6.40E-01	No	ND	--	No	1.10E+05	No	No	<SGW
Heptachlor epoxide	ug/kg	10	30%	1.01E+00	2.30E+00	No	ND	--	No	3.30E+03	No	No	<SGW
Indeno(1,2,3-cd)pyrene	ug/kg	10	40%	3.55E+02	2.00E+03	No	ND	--	No	6.90E+04	No	No	<SGW
Iron	mg/kg	10	100%	1.54E+04	2.10E+04	Yes	3.80E+04	No	Yes	NA	No	No	EN
Lead	mg/kg	10	100%	1.00E+02	2.60E+02	No	1.85E+02	Yes	No	NA	No	No	NA
Magnesium	mg/kg	10	100%	7.63E+03	2.10E+04	Yes	1.72E+04	Yes	Yes	NA	No	No	EN
Manganese	mg/kg	10	100%	4.14E+02	6.10E+02	No	8.83E+02	No	Yes	NA	No	No	<BK
MCPA[(4-chloro-2-methylpheno	ug/kg	10	30%	1.57E+03	3.70E+03	No	1.45E+04	No	Yes	NA	No	No	<BK
Mercury	mg/kg	10	100%	1.22E-01	5.70E-01	No	1.77E-01	Yes	No	5.00E-02	Yes	Yes	>SGW
Methoxychlor	ug/kg	10	50%	6.20E+00	9.70E+00	No	ND	--	No	7.80E+05	No	No	<SGW
Molybdenum	mg/kg	10	100%	1.02E+00	2.30E+00	No	2.02E+00	Yes	No	NA	No	No	NA
Naphthalene	ug/kg	10	20%	6.00E+01	7.90E+01	No	ND	--	No	4.20E+05	No	No	<SGW
Nickel	mg/kg	10	100%	1.82E+01	2.40E+01	No	4.27E+01	No	Yes	4.00E+02	No	No	<SGW
Pentachlorophenol	ug/kg	10	100%	2.89E+02	5.03E+02	No	See notes	--	No	1.00E+02	Yes	Yes	>SGW
Phenanthrene	ug/kg	10	70%	1.35E+03	9.20E+03	No	3.35E+02	Yes	No	5.90E+07	No	No	<SGW
Potassium	mg/kg	10	100%	1.84E+03	2.60E+03	Yes	4.73E+03	No	Yes	NA	No	No	EN
Pyrene	ug/kg	10	70%	1.35E+03	8.50E+03	No	4.35E+02	Yes	No	2.10E+07	No	No	<SGW
Selenium	mg/kg	10	10%	5.79E-01	8.80E-01	No	ND	--	No	2.40E+00	No	No	<SGW
Silver	mg/kg	10	30%	3.25E-01	4.45E-01	No	1.35E+00	No	Yes	NA	No	No	<BK
Thallium	mg/kg	10	30%	6.64E-01	1.10E+00	No	ND	--	No	1.60E+01	No	No	<SGW
Toluene	ug/kg	10	10%	2.86E+00	4.50E+00	No	ND	--	No	2.90E+04	No	No	<SGW
Total PCBs	ug/kg	10	50%	3.21E+01	5.80E+01	No	See notes	--	No	NA	No	No	NA
Vanadium	mg/kg	10	100%	2.58E+01	3.50E+01	No	6.90E+01	No	Yes	NA	No	No	<BK
Zinc	mg/kg	10	100%	2.22E+02	5.50E+02	No	8.08E+02	No	Yes	2.00E+03	No	No	<SGW

Surface Soil - Soil-to-Groundwater TACO Screen
Transect 5

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Total 2,3,7,8-TCDD TEQ	ug/kg	4	100%	7.87E-03	2.18E-02	No	ND	--	No	NA	No	No	NA
2,4-DB	ug/kg	9	22%	8.15E+00	2.30E+01	No	ND	--	No	NA	No	No	NA
2-Butanone (MEK)	ug/kg	9	56%	1.83E+01	3.40E+01	No	ND	--	No	NA	No	No	NA
4,4'-DDD	ug/kg	9	11%	6.73E+00	3.60E+01	No	ND	--	No	8.00E+04	No	No	<SGW
4,4'-DDE	ug/kg	9	33%	3.15E+00	8.30E+00	No	1.61E+01	No	Yes	2.70E+05	No	No	<SGW
4,4'-DDT	ug/kg	9	33%	1.67E+01	1.10E+02	No	1.41E+01	Yes	No	1.60E+05	No	No	<SGW
Acenaphthylene	ug/kg	9	11%	3.40E+01	3.40E+01	No	ND	--	No	2.90E+06	No	No	<SGW
Acetone	ug/kg	9	56%	1.37E+02	4.60E+02	No	ND	--	No	1.60E+04	No	No	<SGW
Aldrin	ug/kg	9	11%	3.96E+00	2.30E+01	No	ND	--	No	2.50E+03	No	No	<SGW
Alpha Chlordane	ug/kg	9	33%	8.12E+00	5.40E+01	No	ND	--	No	4.80E+04	No	No	<SGW
Aluminum	mg/kg	9	100%	8.37E+03	1.10E+04	No	2.54E+04	No	Yes	NA	No	No	<BK
Anthracene	ug/kg	9	11%	8.90E+01	8.90E+01	No	1.60E+02	No	Yes	5.90E+07	No	No	<SGW
Antimony	mg/kg	9	33%	7.18E-01	9.05E-01	No	3.80E+00	No	Yes	2.00E+01	No	No	<SGW
Arsenic	mg/kg	9	100%	6.33E+00	7.60E+00	No	1.91E+01	No	Yes	1.00E+02	No	No	<SGW
Barium	mg/kg	9	100%	1.74E+02	1.90E+02	No	3.63E+02	No	Yes	2.60E+02	No	No	<SGW
Benzene	ug/kg	9	11%	1.80E+00	1.80E+00	No	ND	--	No	1.70E+02	No	No	<SGW
Benzo(a)anthracene	ug/kg	9	67%	1.21E+02	4.60E+02	No	2.40E+02	Yes	No	8.00E+03	No	No	<SGW
Benzo(a)pyrene	ug/kg	9	44%	1.38E+02	6.00E+02	No	1.87E+02	Yes	No	8.20E+04	No	No	<SGW
Benzo(b)fluoranthene	ug/kg	9	67%	1.78E+02	7.80E+02	No	1.79E+02	Yes	No	2.50E+04	No	No	<SGW
Benzo(g,h,i)perylene	ug/kg	9	44%	1.58E+02	4.30E+02	No	1.27E+02	Yes	No	2.10E+07	No	No	<SGW
Benzo(k)fluoranthene	ug/kg	9	44%	1.59E+02	6.00E+02	No	2.08E+02	Yes	No	2.50E+05	No	No	<SGW
Beryllium	mg/kg	9	100%	5.29E-01	6.60E-01	No	1.51E+00	No	Yes	1.40E+02	No	No	<SGW
beta-BHC	ug/kg	9	11%	1.00E-01	1.00E-01	No	ND	--	No	3.00E+00	No	No	<SGW
bis(2-Ethylhexyl)phthalate	ug/kg	9	44%	1.06E+02	1.80E+02	No	3.22E+02	No	Yes	3.10E+07	No	No	<SGW
Butylbenzylphthalate	ug/kg	9	11%	1.22E+02	3.40E+02	No	ND	--	No	9.30E+05	No	No	<SGW
Cadmium	mg/kg	9	100%	3.42E+00	8.40E+00	No	8.65E+00	No	Yes	1.00E+01	No	No	<SGW
Calcium	mg/kg	9	100%	9.93E+03	2.05E+04	Yes	3.35E+04	No	Yes	NA	No	No	EN
Carbazole	ug/kg	9	11%	7.10E+01	7.10E+01	No	6.40E+01	Yes	No	2.80E+03	No	No	<SGW
Chromium	mg/kg	9	100%	1.46E+01	1.85E+01	No	3.93E+01	No	Yes	NA	No	No	<BK
Chrysene	ug/kg	9	67%	1.70E+02	7.10E+02	No	2.73E+02	Yes	No	8.00E+05	No	No	<SGW
Cobalt	mg/kg	9	100%	5.99E+00	6.90E+00	No	1.55E+01	No	Yes	NA	No	No	<BK
Copper	mg/kg	9	100%	5.42E+01	8.45E+01	No	2.09E+02	No	Yes	3.30E+02	No	No	<SGW
Dibenzo(a,h)anthracene	ug/kg	9	44%	9.86E+01	3.20E+02	No	ND	--	No	7.60E+03	No	No	<SGW
Dicamba	ug/kg	9	22%	2.10E+00	2.90E+00	No	ND	--	No	NA	No	No	NA
Dieldrin	ug/kg	9	22%	1.58E+01	1.20E+02	No	ND	--	No	2.00E+01	Yes	Yes	>SGW
Diethylphthalate	ug/kg	9	11%	3.90E+01	3.90E+01	No	1.87E+02	No	Yes	4.70E+05	No	No	<SGW
Di-n-butylphthalate	ug/kg	9	22%	3.35E+01	3.50E+01	No	3.12E+02	No	Yes	2.30E+06	No	No	<SGW
Endrin	ug/kg	9	11%	2.62E+00	6.10E+00	No	ND	--	No	5.00E+03	No	No	<SGW
Endrin aldehyde	ug/kg	9	22%	2.29E+00	5.06E+00	No	ND	--	No	5.00E+03	No	No	<SGW

Surface Soil - Soil-to-Groundwater TACO Screen
Transect 5

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Endrin ketone	ug/kg	9	11%	2.47E+00	4.95E+00	No	ND	--	No	5.00E+03	No	No	<SGW
Fluoranthene	ug/kg	9	56%	2.43E+02	1.10E+03	No	5.02E+02	Yes	No	2.10E+07	No	No	<SGW
Gamma Chlordane	ug/kg	9	22%	1.77E+01	7.80E+01	No	ND	--	No	4.80E+04	No	No	<SGW
Heptachlor	ug/kg	9	11%	1.15E+01	9.10E+01	No	ND	--	No	1.10E+05	No	No	<SGW
Heptachlor epoxide	ug/kg	9	22%	4.94E+00	3.00E+01	No	ND	--	No	3.30E+03	No	No	<SGW
Indeno(1,2,3-cd)pyrene	ug/kg	9	56%	1.71E+02	4.50E+02	No	ND	--	No	6.90E+04	No	No	<SGW
Iron	mg/kg	9	100%	1.39E+04	1.60E+04	Yes	3.80E+04	No	Yes	NA	No	No	EN
Lead	mg/kg	9	100%	8.03E+01	1.70E+02	No	1.85E+02	No	Yes	NA	No	No	<BK
Magnesium	mg/kg	9	100%	4.13E+03	5.00E+03	Yes	1.72E+04	No	Yes	NA	No	No	EN
Manganese	mg/kg	9	100%	3.48E+02	4.00E+02	No	8.83E+02	No	Yes	NA	No	No	<BK
MCPA	ug/kg	9	22%	1.58E+03	4.40E+03	No	1.45E+04	No	Yes	NA	No	No	<BK
MCPP	ug/kg	9	67%	2.95E+03	6.80E+03	No	9.97E+03	No	Yes	NA	No	No	<BK
Mercury	mg/kg	9	100%	6.97E-02	1.15E-01	No	1.77E-01	No	Yes	5.00E-02	Yes	No	<BK
Methoxychlor	ug/kg	9	33%	1.47E+01	3.80E+01	No	ND	--	No	7.80E+05	No	No	<SGW
Molybdenum	mg/kg	9	100%	4.64E-01	7.80E-01	No	2.02E+00	No	Yes	NA	No	No	<BK
Nickel	mg/kg	9	100%	1.68E+01	1.90E+01	No	4.27E+01	No	Yes	4.00E+02	No	No	<SGW
Pentachlorophenol	ug/kg	9	33%	2.34E+02	2.41E+02	No	See notes	--	No	1.00E+02	Yes	Yes	>SGW
Phenanthrene	ug/kg	9	67%	1.01E+02	3.60E+02	No	3.35E+02	Yes	No	5.90E+07	No	No	<SGW
Potassium	mg/kg	9	100%	1.76E+03	2.40E+03	Yes	4.73E+03	No	Yes	NA	No	No	EN
Pyrene	ug/kg	9	56%	1.99E+02	8.10E+02	No	4.35E+02	Yes	No	2.10E+07	No	No	<SGW
Selenium	mg/kg	9	11%	4.80E-01	4.80E-01	No	ND	--	No	2.40E+00	No	No	<SGW
Silver	mg/kg	9	33%	5.01E-01	6.00E-01	No	1.35E+00	No	Yes	NA	No	No	<BK
Toluene	ug/kg	9	11%	2.70E+00	2.80E+00	No	ND	--	No	2.90E+04	No	No	<SGW
Total PCBs	ug/kg	9	78%	6.67E+01	1.65E+02	No	See notes	--	No	NA	No	No	NA
Vanadium	mg/kg	9	100%	2.43E+01	2.90E+01	No	6.90E+01	No	Yes	NA	No	No	<BK
Zinc	mg/kg	9	100%	3.74E+02	9.80E+02	No	8.08E+02	Yes	No	2.00E+03	No	No	<SGW

Surface Soil - Soil-to-Groundwater TACO Screen
Transect 6

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Total 2,3,7,8-TCDD TEQ	ug/kg	4	100%	6.37E-03	1.32E-02	No	ND	--	No	NA	No	No	NA
4,4'-DDD	ug/kg	8	25%	2.93E+00	6.40E+00	No	ND	--	No	8.00E+04	No	No	<SGW
4,4'-DDE	ug/kg	8	75%	5.35E+00	1.80E+01	No	1.61E+01	Yes	No	2.70E+05	No	No	<SGW
4,4'-DDT	ug/kg	8	38%	3.56E+01	1.40E+02	No	1.41E+01	Yes	No	1.60E+05	No	No	<SGW
Acenaphthene	ug/kg	8	25%	1.26E+02	4.20E+02	No	ND	--	No	2.90E+06	No	No	<SGW
Acetone	ug/kg	8	38%	1.05E+02	4.20E+02	No	ND	--	No	1.60E+04	No	No	<SGW
Alpha Chlordane	ug/kg	8	25%	4.52E+00	1.70E+01	No	ND	--	No	4.80E+04	No	No	<SGW
alpha-BHC	ug/kg	8	13%	2.20E-01	2.20E-01	No	ND	--	No	3.00E+00	No	No	<SGW
Aluminum	mg/kg	8	100%	7.98E+03	9.70E+03	No	2.54E+04	No	Yes	NA	No	No	<BK
Anthracene	ug/kg	8	38%	2.43E+02	1.40E+03	No	1.60E+02	Yes	No	5.90E+07	No	No	<SGW
Antimony	mg/kg	8	50%	6.88E-01	7.70E-01	No	3.80E+00	No	Yes	2.00E+01	No	No	<SGW
Arsenic	mg/kg	8	100%	6.01E+00	9.20E+00	No	1.91E+01	No	Yes	1.00E+02	No	No	<SGW
Barium	mg/kg	8	100%	1.50E+02	2.00E+02	No	3.63E+02	No	Yes	2.60E+02	No	No	<SGW
Benzo(a)anthracene	ug/kg	8	88%	6.06E+02	4.20E+03	No	2.40E+02	Yes	No	8.00E+03	No	No	<SGW
Benzo(a)pyrene	ug/kg	8	25%	5.04E+02	3.60E+03	No	1.87E+02	Yes	No	8.20E+04	No	No	<SGW
Benzo(b)fluoranthene	ug/kg	8	88%	6.34E+02	4.40E+03	No	1.79E+02	Yes	No	2.50E+04	No	No	<SGW
Benzo(g,h,i)perylene	ug/kg	8	13%	2.48E+02	1.30E+03	No	1.27E+02	Yes	No	2.10E+07	No	No	<SGW
Benzo(k)fluoranthene	ug/kg	8	25%	5.03E+02	3.40E+03	No	2.08E+02	Yes	No	2.50E+05	No	No	<SGW
Beryllium	mg/kg	8	88%	4.90E-01	8.60E-01	No	1.51E+00	No	Yes	1.40E+02	No	No	<SGW
beta-BHC	ug/kg	8	13%	1.34E+00	3.80E+00	No	ND	--	No	3.00E+00	Yes	Yes	>SGW
bis(2-Ethylhexyl)phthalate	ug/kg	8	25%	1.19E+02	3.60E+02	No	3.22E+02	Yes	No	3.10E+07	No	No	<SGW
Butylbenzylphthalate	ug/kg	8	13%	5.70E+01	5.70E+01	No	ND	--	No	9.30E+05	No	No	<SGW
Cadmium	mg/kg	8	100%	1.50E+00	4.00E+00	No	8.65E+00	No	Yes	1.00E+01	No	No	<SGW
Calcium	mg/kg	8	100%	6.26E+04	1.50E+05	Yes	3.35E+04	Yes	Yes	NA	No	No	EN
Carbazole	ug/kg	8	13%	1.91E+02	8.60E+02	No	6.40E+01	Yes	No	2.80E+03	No	No	<SGW
Chromium	mg/kg	8	100%	1.44E+01	1.80E+01	No	3.93E+01	No	Yes	NA	No	No	<BK
Chrysene	ug/kg	8	88%	7.12E+02	4.90E+03	No	2.73E+02	Yes	No	8.00E+05	No	No	<SGW
Cobalt	mg/kg	8	100%	5.96E+00	9.20E+00	No	1.55E+01	No	Yes	NA	No	No	<BK
Copper	mg/kg	8	100%	2.93E+01	5.60E+01	No	2.09E+02	No	Yes	3.30E+02	No	No	<SGW
delta-BHC	ug/kg	8	13%	1.20E-01	1.20E-01	No	ND	--	No	3.00E+00	No	No	<SGW
Dibenzo(a,h)anthracene	ug/kg	8	38%	1.18E+02	6.00E+02	No	ND	--	No	7.60E+03	No	No	<SGW
Dibenzofuran	ug/kg	8	13%	1.12E+02	2.30E+02	No	ND	--	No	NA	No	No	NA
Dicamba	ug/kg	8	25%	2.35E+00	3.00E+00	No	ND	--	No	NA	No	No	NA
Dieldrin	ug/kg	8	13%	1.80E+00	1.80E+00	No	ND	--	No	2.00E+01	No	No	<SGW
Endosulfan sulfate	ug/kg	8	38%	1.14E+00	1.90E+00	No	ND	--	No	9.00E+04	No	No	<SGW
Endrin	ug/kg	8	13%	1.99E+00	2.20E+00	No	ND	--	No	5.00E+03	No	No	<SGW
Endrin aldehyde	ug/kg	8	13%	7.50E-01	7.50E-01	No	ND	--	No	5.00E+03	No	No	<SGW
Endrin ketone	ug/kg	8	25%	4.50E-01	6.70E-01	No	ND	--	No	5.00E+03	No	No	<SGW
Fluoranthene	ug/kg	8	88%	1.38E+03	9.80E+03	No	5.02E+02	Yes	No	2.10E+07	No	No	<SGW

Surface Soil - Soil-to-Groundwater TACO Screen
Transect 6

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Fluorene	ug/kg	8	13%	1.56E+02	5.80E+02	No	ND	--	No	2.80E+06	No	No	<SGW
Gamma Chlordane	ug/kg	8	25%	4.70E+00	1.80E+01	No	ND	--	No	4.80E+04	No	No	<SGW
gamma-BHC (Lindane)	ug/kg	8	13%	1.30E-01	1.30E-01	No	ND	--	No	4.70E+01	No	No	<SGW
Heptachlor	ug/kg	8	13%	1.78E+00	4.10E+00	No	ND	--	No	1.10E+05	No	No	<SGW
Heptachlor epoxide	ug/kg	8	13%	1.80E-01	1.80E-01	No	ND	--	No	3.30E+03	No	No	<SGW
Indeno(1,2,3-cd)pyrene	ug/kg	8	50%	2.20E+02	1.10E+03	No	ND	--	No	6.90E+04	No	No	<SGW
Iron	mg/kg	8	100%	1.36E+04	1.90E+04	Yes	3.80E+04	No	Yes	NA	No	No	EN
Lead	mg/kg	8	100%	5.54E+01	1.10E+02	No	1.85E+02	No	Yes	NA	No	No	<BK
Magnesium	mg/kg	8	100%	8.71E+03	1.80E+04	Yes	1.72E+04	Yes	Yes	NA	No	No	EN
Manganese	mg/kg	8	100%	3.85E+02	6.60E+02	No	8.83E+02	No	Yes	NA	No	No	<BK
MCPP	ug/kg	8	13%	1.55E+03	4.50E+03	No	9.97E+03	No	Yes	NA	No	No	<BK
Mercury	mg/kg	8	100%	5.73E-02	8.60E-02	No	1.77E-01	No	Yes	5.00E-02	Yes	No	<BK
Methoxychlor	ug/kg	8	38%	3.60E+00	5.50E+00	No	ND	--	No	7.80E+05	No	No	<SGW
Molybdenum	mg/kg	8	100%	8.40E-01	3.20E+00	No	2.02E+00	Yes	No	NA	No	No	NA
Nickel	mg/kg	8	100%	1.73E+01	2.30E+01	No	4.27E+01	No	Yes	4.00E+02	No	No	<SGW
Pentachlorophenol	ug/kg	8	63%	2.40E+02	2.49E+02	No	See notes	--	No	1.00E+02	Yes	Yes	>SGW
Phenanthrene	ug/kg	8	75%	9.75E+02	7.10E+03	No	3.35E+02	Yes	No	5.90E+07	No	No	<SGW
Potassium	mg/kg	8	100%	1.78E+03	2.40E+03	Yes	4.73E+03	No	Yes	NA	No	No	EN
Pyrene	ug/kg	8	75%	1.11E+03	7.70E+03	No	4.35E+02	Yes	No	2.10E+07	No	No	<SGW
Selenium	mg/kg	8	13%	5.66E-01	6.80E-01	No	ND	--	No	2.40E+00	No	No	<SGW
Silver	mg/kg	8	13%	2.90E-01	2.90E-01	No	1.35E+00	No	Yes	NA	No	No	<BK
Thallium	mg/kg	8	25%	6.19E-01	9.70E-01	No	ND	--	No	1.60E+01	No	No	<SGW
Toluene	ug/kg	8	13%	2.20E+00	2.20E+00	No	ND	--	No	2.90E+04	No	No	<SGW
Total PCBs	*ug/kg*	*8*	*75%*	*8.31E+01*	*3.85E+02*	*No*	*See notes*	*--*	*No*	NA	*No*	*No*	NA
Vanadium	mg/kg	8	100%	2.54E+01	3.30E+01	No	6.90E+01	No	Yes	NA	No	No	<BK
Zinc	mg/kg	8	100%	1.56E+02	3.50E+02	No	8.08E+02	No	Yes	2.00E+03	No	No	<SGW

G-15

Surface Soil - Soil-to-Groundwater TACO Screen
Transect 7

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Total 2,3,7,8-TCDD TEQ	ug/kg	3	100%	2.80E-03	5.23E-03	No	ND	--	No	NA	No	No	NA
2-Butanone (MEK)	ug/kg	9	33%	1.84E+01	3.70E+01	No	ND	--	No	NA	No	No	NA
2-Methylnaphthalene	ug/kg	9	11%	6.50E+01	6.50E+01	No	ND	--	No	4.20E+05	No	No	<SGW
4,4'-DDD	ug/kg	9	11%	1.30E+00	1.30E+00	No	ND	--	No	8.00E+04	No	No	<SGW
4,4'-DDE	ug/kg	9	78%	9.80E+00	5.40E+01	No	1.61E+01	Yes	No	2.70E+05	No	No	<SGW
4,4'-DDT	ug/kg	9	67%	7.71E+00	2.90E+01	No	1.41E+01	Yes	No	1.60E+05	No	No	<SGW
Acenaphthene	ug/kg	9	22%	9.77E+01	1.60E+02	No	ND	--	No	2.90E+06	No	No	<SGW
Acetone	ug/kg	9	56%	1.85E+02	5.00E+02	No	ND	--	No	1.60E+04	No	No	<SGW
Alpha Chlordane	ug/kg	9	22%	2.40E+00	1.10E+01	No	ND	--	No	4.80E+04	No	No	<SGW
Aluminum	mg/kg	9	100%	8.33E+03	1.20E+04	No	2.54E+04	No	Yes	NA	No	No	<BK
Anthracene	ug/kg	9	33%	1.18E+02	3.60E+02	No	1.60E+02	Yes	No	5.90E+07	No	No	<SGW
Antimony	mg/kg	9	11%	5.23E-01	7.30E-01	No	3.80E+00	No	Yes	2.00E+01	No	No	<SGW
Arsenic	mg/kg	9	100%	9.99E+00	3.40E+01	No	1.91E+01	Yes	No	1.00E+02	No	No	<SGW
Barium	mg/kg	9	100%	1.67E+02	2.00E+02	No	3.63E+02	No	Yes	2.60E+02	No	No	<SGW
Benzene	ug/kg	9	22%	3.14E+00	4.80E+00	No	ND	--	No	1.70E+02	No	No	<SGW
Benzo(a)anthracene	ug/kg	9	100%	3.42E+02	1.90E+03	No	2.40E+02	Yes	No	8.00E+03	No	No	<SGW
Benzo(a)pyrene	ug/kg	9	100%	3.74E+02	2.10E+03	No	1.87E+02	Yes	No	8.20E+04	No	No	<SGW
Benzo(b)fluoranthene	ug/kg	9	100%	4.08E+02	2.20E+03	No	1.79E+02	Yes	No	2.50E+04	No	No	<SGW
Benzo(g,h,i)perylene	ug/kg	9	100%	2.29E+02	1.10E+03	No	1.27E+02	Yes	No	2.10E+07	No	No	<SGW
Benzo(k)fluoranthene	ug/kg	9	100%	3.54E+02	2.10E+03	No	2.08E+02	Yes	No	2.50E+05	No	No	<SGW
Beryllium	mg/kg	9	33%	4.23E-01	8.25E-01	No	1.51E+00	No	Yes	1.40E+02	No	No	<SGW
bis(2-Ethylhexyl)phthalate	ug/kg	9	44%	7.18E+01	9.10E+01	No	3.22E+02	No	Yes	3.10E+07	No	No	<SGW
Butylbenzylphthalate	ug/kg	9	11%	5.80E+01	5.80E+01	No	ND	--	No	9.30E+05	No	No	<SGW
Cadmium	mg/kg	9	100%	3.12E+00	6.10E+00	No	8.65E+00	No	Yes	1.00E+01	No	No	<SGW
Calcium	mg/kg	9	100%	1.46E+04	3.80E+04	Yes	3.35E+04	Yes	Yes	NA	No	No	EN
Carbazole	ug/kg	9	33%	1.16E+02	3.10E+02	No	6.40E+01	Yes	No	2.80E+03	No	No	<SGW
Carbon disulfide	ug/kg	9	22%	3.17E+00	4.30E+00	No	ND	--	No	1.60E+05	No	No	<SGW
Chromium	mg/kg	9	100%	1.53E+01	2.00E+01	No	3.93E+01	No	Yes	NA	No	No	<BK
Chrysene	ug/kg	9	100%	4.86E+02	2.60E+03	No	2.73E+02	Yes	No	8.00E+05	No	No	<SGW
Cobalt	mg/kg	9	100%	6.63E+00	7.80E+00	No	1.55E+01	No	Yes	NA	No	No	<BK
Copper	mg/kg	9	100%	4.29E+01	1.30E+02	No	2.09E+02	No	Yes	3.30E+02	No	No	<SGW
delta-BHC	ug/kg	9	11%	1.80E-01	1.80E-01	No	ND	--	No	3.00E+00	No	No	<SGW
Dibenzo(a,h)anthracene	ug/kg	9	33%	1.03E+02	4.10E+02	No	ND	--	No	7.60E+03	No	No	<SGW
Dibenzofuran	ug/kg	9	11%	5.20E+01	5.20E+01	No	ND	--	No	NA	No	No	NA
Dicamba	ug/kg	9	11%	2.65E+00	2.65E+00	No	ND	--	No	NA	No	No	NA
Dieldrin	ug/kg	9	22%	1.81E+00	3.00E+00	No	ND	--	No	2.00E+01	No	No	<SGW
Di-n-butylphthalate	ug/kg	9	78%	8.86E+01	1.70E+02	No	3.12E+02	No	Yes	2.30E+06	No	No	<SGW
Endosulfan II	ug/kg	9	11%	1.00E+00	1.00E+00	No	ND	--	No	9.00E+04	No	No	<SGW
Endrin	ug/kg	9	22%	2.50E-01	4.00E-01	No	ND	--	No	5.00E+03	No	No	<SGW
Endrin ketone	ug/kg	9	44%	1.40E+00	1.90E+00	No	ND	--	No	5.00E+03	No	No	<SGW

Surface Soil - Soil-to-Groundwater TACO Screen
Transect 7

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Ethylbenzene	ug/kg	9	11%	2.75E+00	3.00E+00	No	ND	--	No	1.90E+04	No	No	<SGW
Fluoranthene	ug/kg	9	100%	9.66E+02	5.60E+03	No	5.02E+02	Yes	No	2.10E+07	No	No	<SGW
Fluorene	ug/kg	9	22%	9.51E+01	1.40E+02	No	ND	--	No	2.80E+06	No	No	<SGW
Gamma Chlordane	ug/kg	9	44%	1.97E+00	1.00E+01	No	ND	--	No	4.80E+04	No	No	<SGW
gamma-BHC (Lindane)	ug/kg	9	11%	8.70E-02	8.70E-02	No	ND	--	No	4.70E+01	No	No	<SGW
Heptachlor epoxide	ug/kg	9	22%	4.40E-01	6.20E-01	No	ND	--	No	3.30E+03	No	No	<SGW
Indeno(1,2,3-cd)pyrene	ug/kg	9	44%	2.40E+02	1.10E+03	No	ND	--	No	6.90E+04	No	No	<SGW
Iron	mg/kg	9	100%	1.47E+04	1.75E+04	Yes	3.80E+04	No	Yes	NA	No	No	EN
Lead	mg/kg	9	100%	6.46E+01	1.50E+02	No	1.85E+02	No	Yes	NA	No	No	<BK
Magnesium	mg/kg	9	100%	5.66E+03	1.10E+04	Yes	1.72E+04	No	Yes	NA	No	No	EN
Manganese	mg/kg	9	100%	3.45E+02	4.35E+02	No	8.83E+02	No	Yes	NA	No	No	<BK
Mercury	mg/kg	9	100%	8.51E-02	1.60E-01	No	1.77E-01	No	Yes	5.00E-02	Yes	No	<BK
Methoxychlor	ug/kg	9	56%	6.82E+00	1.00E+01	No	ND	--	No	7.80E+05	No	No	<SGW
Molybdenum	mg/kg	9	89%	7.93E-01	1.80E+00	No	2.02E+00	No	Yes	NA	No	No	<BK
Nickel	mg/kg	9	100%	2.17E+01	5.50E+01	No	4.27E+01	Yes	No	4.00E+02	No	No	<SGW
Pentachlorophenol	ug/kg	9	33%	2.41E+02	2.51E+02	No	See notes	--	No	1.00E+02	Yes	Yes	>SGW
Phenanthrene	ug/kg	9	100%	5.09E+02	2.90E+03	No	3.35E+02	Yes	No	5.90E+07	No	No	<SGW
Potassium	mg/kg	9	100%	2.02E+03	2.85E+03	Yes	4.73E+03	No	Yes	NA	No	No	EN
Pyrene	ug/kg	9	100%	6.86E+02	3.90E+03	No	4.35E+02	Yes	No	2.10E+07	No	No	<SGW
Selenium	mg/kg	9	67%	6.93E-01	1.10E+00	No	ND	--	No	2.40E+00	No	No	<SGW
Silver	mg/kg	9	44%	3.65E-01	4.40E-01	No	1.35E+00	No	Yes	NA	No	No	<BK
Thallium	mg/kg	9	11%	5.72E-01	8.50E-01	No	ND	--	No	1.60E+01	No	No	<SGW
Toluene	ug/kg	9	44%	4.68E+00	1.20E+01	No	ND	--	No	2.90E+04	No	No	<SGW
Total PCBs	ug/kg	9	89%	3.52E+01	9.00E+01	No	See notes	--	No	NA	No	No	NA
Trichloroethene	ug/kg	9	11%	2.56E+00	2.60E+00	No	ND	--	No	3.00E+02	No	No	<SGW
Vanadium	mg/kg	9	100%	2.47E+01	3.25E+01	No	6.90E+01	No	Yes	NA	No	No	<BK
Xylenes, Total	ug/kg	9	11%	3.18E+00	4.20E+00	No	ND	--	No	1.50E+05	No	No	<SGW
Zinc	mg/kg	9	100%	3.84E+02	8.70E+02	No	8.08E+02	Yes	No	2.00E+03	No	No	<SGW

Suburface Soil - Soil-to-Groundwater TACO Screen
Transect 1

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Subsurface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Total 2,3,7,8-TCDD TEQ	ug/kg	3	100%	1.33E-05	2.00E-05	No	ND	--	No	NA	No	No	NA
2-Butanone (MEK)	ug/kg	10	10%	1.71E+01	2.50E+01	No	ND	--	No	NA	No	No	NA
4,4'-DDD	ug/kg	10	10%	5.30E-01	5.30E-01	No	ND	--	No	8.00E+04	No	No	<SGW
4,4'-DDE	ug/kg	10	20%	1.80E-01	2.20E-01	No	ND	--	No	2.70E+05	No	No	<SGW
4,4'-DDT	ug/kg	10	10%	2.70E-01	2.70E-01	No	ND	--	No	1.60E+05	No	No	<SGW
Acetone	ug/kg	10	10%	5.34E+01	2.40E+02	No	1.10E+01	Yes	No	1.60E+04	No	No	<SGW
Alpha Chlordane	ug/kg	10	10%	5.80E-01	5.80E-01	No	ND	--	No	4.80E+04	No	No	<SGW
Aluminum	mg/kg	10	100%	7.36E+03	1.70E+04	No	2.03E+04	No	Yes	NA	No	No	<BK
Antimony	mg/kg	10	50%	6.86E-01	8.40E-01	No	2.40E+00	No	Yes	2.00E+01	No	No	<SGW
Arsenic	mg/kg	10	100%	5.82E+00	8.70E+00	No	1.74E+01	No	Yes	1.00E+02	No	No	<SGW
Barium	mg/kg	10	100%	1.85E+02	2.60E+02	No	3.73E+02	No	Yes	2.60E+02	No	No	<SGW
Beryllium	mg/kg	10	100%	4.59E-01	9.30E-01	No	1.27E+00	No	Yes	1.40E+02	No	No	<SGW
bis(2-Ethylhexyl)phthalate	ug/kg	10	20%	1.02E+02	1.50E+02	No	ND	--	No	3.10E+07	No	No	<SGW
Cadmium	mg/kg	10	90%	2.78E-01	5.30E-01	No	6.87E+00	No	Yes	1.00E+01	No	No	<SGW
Calcium	mg/kg	10	100%	1.29E+04	1.80E+04	Yes	1.61E+04	Yes	Yes	NA	No	No	EN
Chromium	mg/kg	10	100%	1.25E+01	2.50E+01	No	3.27E+01	No	Yes	NA	No	No	<BK
Cobalt	mg/kg	10	100%	5.98E+00	1.10E+01	No	1.39E+01	No	Yes	NA	No	No	<BK
Copper	mg/kg	10	100%	1.29E+01	2.40E+01	No	1.55E+02	No	Yes	3.30E+02	No	No	<SGW
Dicamba	ug/kg	10	10%	1.30E+00	1.30E+00	No	ND	--	No	NA	No	No	NA
Dieldrin	ug/kg	10	20%	6.60E-01	1.20E+00	No	ND	--	No	2.00E+01	No	No	<SGW
Endrin ketone	ug/kg	10	20%	2.25E-01	2.70E-01	No	ND	--	No	5.00E+03	No	No	<SGW
Heptachlor	ug/kg	10	10%	2.60E-01	2.60E-01	No	ND	--	No	1.10E+05	No	No	<SGW
Heptachlor epoxide	ug/kg	10	30%	3.26E-01	5.70E-01	No	ND	--	No	3.30E+03	No	No	<SGW
Iron	mg/kg	10	100%	1.28E+04	2.20E+04	Yes	3.33E+04	No	Yes	NA	No	No	EN
Lead	mg/kg	10	100%	9.53E+00	1.50E+01	No	1.42E+02	No	Yes	NA	No	No	<BK
Magnesium	mg/kg	10	100%	5.90E+03	8.30E+03	Yes	9.33E+03	No	Yes	NA	No	No	EN
Manganese	mg/kg	10	100%	3.57E+02	9.80E+02	No	8.00E+02	Yes	No	NA	No	No	NA
MCPA[(4-chloro-2-methylphenox	ug/kg	10	10%	1.24E+03	1.70E+03	No	ND	--	No	NA	No	No	NA
Mercury	mg/kg	10	70%	2.18E-02	7.00E-02	No	5.61E-02	Yes	No	5.00E-02	Yes	Yes	>SGW
Methoxychlor	ug/kg	10	20%	2.10E+00	2.60E+00	No	ND	--	No	7.80E+05	No	No	<SGW
Methylene chloride (Dichloromet	ug/kg	10	10%	2.40E+00	2.40E+00	No	2.80E+00	No	Yes	2.00E+02	No	No	<SGW
Molybdenum	mg/kg	10	100%	3.98E-01	7.60E-01	No	1.75E+00	No	Yes	NA	No	No	<BK
Nickel	mg/kg	10	100%	1.63E+01	3.30E+01	No	3.73E+01	No	Yes	4.00E+02	No	No	<SGW
Potassium	mg/kg	10	100%	1.42E+03	2.70E+03	Yes	4.20E+03	No	Yes	NA	No	No	EN
Total PCBs	ug/kg	10	30%	1.10E+01	1.90E+01	No	ND	--	No	NA	No	No	NA
Trichloroethene	ug/kg	10	30%	3.70E+00	7.40E+00	No	ND	--	No	3.00E+02	No	No	<SGW
Vanadium	mg/kg	10	100%	2.24E+01	4.50E+01	No	5.80E+01	No	Yes	NA	No	No	<BK
Zinc	mg/kg	10	100%	6.52E+01	2.50E+02	No	6.41E+02	No	Yes	2.00E+03	No	No	<SGW

Suburface Soil - Soil-to-Groundwater TACO Screen
Transect 2

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Subsurface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Total 2,3,7,8-TCDD TEQ	ug/kg	2	100%	5.75E-02	6.50E-02	No	ND	--	No	NA	No	No	NA
2-Butanone (MEK)	ug/kg	9	11%	1.70E+01	2.33E+01	No	ND	--	No	NA	No	No	NA
Acetone	ug/kg	9	22%	3.98E+01	1.07E+02	No	1.10E+01	Yes	No	1.60E+04	No	No	<SGW
Aluminum	mg/kg	9	100%	5.61E+03	1.10E+04	No	2.03E+04	No	Yes	NA	No	No	<BK
Antimony	mg/kg	9	11%	6.70E-01	6.70E-01	No	2.40E+00	No	Yes	2.00E+01	No	No	<SGW
Arsenic	mg/kg	9	100%	4.67E+00	7.00E+00	No	1.74E+01	No	Yes	1.00E+02	No	No	<SGW
Barium	mg/kg	9	100%	1.63E+02	2.20E+02	No	3.73E+02	No	Yes	2.60E+02	No	No	<SGW
Beryllium	mg/kg	9	44%	2.63E-01	3.70E-01	No	1.27E+00	No	Yes	1.40E+02	No	No	<SGW
bis(2-Ethylhexyl)phthalate	ug/kg	9	56%	9.23E+01	1.60E+02	No	ND	--	No	3.10E+07	No	No	<SGW
Cadmium	mg/kg	9	100%	2.01E-01	3.20E-01	No	6.87E+00	No	Yes	1.00E+01	No	No	<SGW
Calcium	mg/kg	9	100%	1.16E+04	1.50E+04	Yes	1.61E+04	No	Yes	NA	No	No	EN
Chromium	mg/kg	9	100%	9.61E+00	1.50E+01	No	3.27E+01	No	Yes	NA	No	No	<BK
Cobalt	mg/kg	9	100%	5.21E+00	8.30E+00	No	1.39E+01	No	Yes	NA	No	No	<BK
Copper	mg/kg	9	100%	8.64E+00	1.60E+01	No	1.55E+02	No	Yes	3.30E+02	No	No	<SGW
Dieldrin	ug/kg	9	11%	4.10E-01	4.10E-01	No	ND	--	No	2.00E+01	No	No	<SGW
Iron	mg/kg	9	100%	1.05E+04	1.60E+04	Yes	3.33E+04	No	Yes	NA	No	No	EN
Lead	mg/kg	9	100%	7.82E+00	1.20E+01	No	1.42E+02	No	Yes	NA	No	No	<BK
Magnesium	mg/kg	9	100%	5.19E+03	6.80E+03	Yes	9.33E+03	No	Yes	NA	No	No	EN
Manganese	mg/kg	9	100%	2.37E+02	4.80E+02	No	8.00E+02	No	Yes	NA	No	No	<BK
Mercury	mg/kg	9	67%	1.24E-02	2.90E-02	No	5.61E-02	No	Yes	5.00E-02	No	No	<SGW
Molybdenum	mg/kg	9	100%	4.59E-01	7.70E-01	No	1.75E+00	No	Yes	NA	No	No	<BK
Nickel	mg/kg	9	100%	1.28E+01	2.00E+01	No	3.73E+01	No	Yes	4.00E+02	No	No	<SGW
Potassium	mg/kg	9	100%	1.16E+03	2.00E+03	Yes	4.20E+03	No	Yes	NA	No	No	EN
Selenium	mg/kg	9	11%	5.05E-01	5.10E-01	No	ND	--	No	2.40E+00	No	No	<SGW
Thallium	mg/kg	9	11%	5.38E-01	5.65E-01	No	ND	--	No	1.60E+01	No	No	<SGW
Vanadium	mg/kg	9	100%	1.77E+01	2.80E+01	No	5.80E+01	No	Yes	NA	No	No	<BK
Zinc	mg/kg	9	100%	3.69E+01	5.70E+01	No	6.41E+02	No	Yes	2.00E+03	No	No	<SGW

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Subsurface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
2-Butanone (MEK)	ug/kg	10	10%	1.67E+01	2.40E+01	No	ND	--	No	NA	No	No	NA
Acetone	ug/kg	10	10%	4.65E+01	1.80E+02	No	1.10E+01	Yes	No	1.60E+04	No	No	<SGW
Aluminum	mg/kg	10	100%	7.35E+03	1.40E+04	No	2.03E+04	No	Yes	NA	No	No	<BK
Antimony	mg/kg	10	40%	7.91E-01	9.15E-01	No	2.40E+00	No	Yes	2.00E+01	No	No	<SGW
Arsenic	mg/kg	10	100%	5.35E+00	8.50E+00	No	1.74E+01	No	Yes	1.00E+02	No	No	<SGW
Barium	mg/kg	10	100%	1.84E+02	2.50E+02	No	3.73E+02	No	Yes	2.60E+02	No	No	<SGW
Benzo(g,h,i)perylene	ug/kg	10	40%	9.23E+01	1.10E+02	No	6.80E+01	Yes	No	2.10E+07	No	No	<SGW
Beryllium	mg/kg	10	50%	3.97E-01	8.90E-01	No	1.27E+00	No	Yes	1.40E+02	No	No	<SGW
bis(2-Ethylhexyl)phthalate	ug/kg	10	40%	9.70E+01	1.20E+02	No	ND	--	No	3.10E+07	No	No	<SGW
Cadmium	mg/kg	10	90%	2.93E-01	5.70E-01	No	6.87E+00	No	Yes	1.00E+01	No	No	<SGW
Calcium	mg/kg	10	100%	1.26E+04	1.90E+04	Yes	1.61E+04	Yes	Yes	NA	No	No	EN
Chromium	mg/kg	10	100%	1.20E+01	2.10E+01	No	3.27E+01	No	Yes	NA	No	No	<BK
Cobalt	mg/kg	10	100%	5.82E+00	8.10E+00	No	1.39E+01	No	Yes	NA	No	No	<BK
Copper	mg/kg	10	100%	1.16E+01	1.90E+01	No	1.55E+02	No	Yes	3.30E+02	No	No	<SGW
Dibenzo(a,h)anthracene	ug/kg	10	10%	5.74E+01	8.70E+01	No	ND	--	No	7.60E+03	No	No	<SGW
Indeno(1,2,3-cd)pyrene	ug/kg	10	10%	9.10E+01	9.20E+01	No	ND	--	No	6.90E+04	No	No	<SGW
Iron	mg/kg	10	100%	1.27E+04	1.90E+04	Yes	3.33E+04	No	Yes	NA	No	No	EN
Lead	mg/kg	10	100%	9.70E+00	1.70E+01	No	1.42E+02	No	Yes	NA	No	No	<BK
Magnesium	mg/kg	10	100%	5.82E+03	7.70E+03	Yes	9.33E+03	No	Yes	NA	No	No	EN
Manganese	mg/kg	10	100%	2.89E+02	5.50E+02	No	8.00E+02	No	Yes	NA	No	No	<BK
Mercury	mg/kg	10	100%	2.41E-02	7.80E-02	No	5.61E-02	Yes	No	5.00E-02	Yes	Yes	>SGW
Molybdenum	mg/kg	10	100%	5.29E-01	9.50E-01	No	1.75E+00	No	Yes	NA	No	No	<BK
Nickel	mg/kg	10	100%	1.50E+01	2.20E+01	No	3.73E+01	No	Yes	4.00E+02	No	No	<SGW
Pentachlorophenol	ug/kg	10	20%	2.50E+02	2.76E+02	No	ND	--	No	1.00E+02	Yes	Yes	>SGW
Potassium	mg/kg	10	100%	1.57E+03	2.70E+03	Yes	4.20E+03	No	Yes	NA	No	No	EN
Sodium	mg/kg	10	30%	8.74E+01	1.60E+02	Yes	3.53E+02	No	Yes	NA	No	No	EN
Total PCBs	ug/kg	10	10%	9.17E+00	9.50E+00	No	ND	--	No	NA	No	No	NA
Vanadium	mg/kg	10	100%	2.16E+01	3.80E+01	No	5.80E+01	No	Yes	NA	No	No	<BK
Zinc	mg/kg	10	100%	6.73E+01	2.60E+02	No	6.41E+02	No	Yes	2.00E+03	No	No	<SGW

Suburface Soil - Soil-to-Groundwater TACO Screen
Transect 4

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Subsurface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
2,4,5-TP (Silvex)	ug/kg	10	10%	1.50E+00	1.50E+00	No	1.08E+01	No	Yes	5.50E+04	No	No	<SGW
2-Butanone (MEK)	ug/kg	10	10%	5.70E+00	5.70E+00	No	ND	--	No	NA	No	No	NA
2-Methylnaphthalene	ug/kg	10	10%	1.07E+02	1.60E+02	No	ND	--	No	4.20E+05	No	No	<SGW
Acenaphthene	ug/kg	10	10%	1.91E+02	1.00E+03	No	ND	--	No	2.90E+06	No	No	<SGW
Acenaphthylene	ug/kg	10	10%	1.63E+02	7.20E+02	No	ND	--	No	2.90E+06	No	No	<SGW
Acetone	ug/kg	10	50%	5.16E+01	2.20E+02	No	1.10E+01	Yes	No	1.60E+04	No	No	<SGW
Aluminum	mg/kg	10	100%	6.17E+03	9.00E+03	No	2.03E+04	No	Yes	NA	No	No	<BK
Anthracene	ug/kg	10	20%	6.27E+02	5.40E+03	No	ND	--	No	5.90E+07	No	No	<SGW
Arsenic	mg/kg	10	100%	4.82E+00	6.00E+00	No	1.74E+01	No	Yes	1.00E+02	No	No	<SGW
Barium	mg/kg	10	100%	1.55E+02	2.10E+02	No	3.73E+02	No	Yes	2.60E+02	No	No	<SGW
Benzo(a)anthracene	ug/kg	10	40%	1.28E+03	1.20E+04	No	5.20E+01	Yes	No	8.00E+03	Yes	Yes	>SGW
Benzo(a)pyrene	ug/kg	10	10%	6.09E+02	5.60E+03	No	ND	--	No	8.20E+04	No	No	<SGW
Benzo(b)fluoranthene	ug/kg	10	10%	1.07E+03	9.80E+03	No	ND	--	No	2.50E+04	No	No	<SGW
Benzo(g,h,i)perylene	ug/kg	10	20%	1.09E+02	3.30E+02	No	6.80E+01	Yes	No	2.10E+07	No	No	<SGW
Benzo(k)fluoranthene	ug/kg	10	10%	7.21E+02	6.30E+03	No	ND	--	No	2.50E+05	No	No	<SGW
Beryllium	mg/kg	10	100%	3.72E-01	5.00E-01	No	1.27E+00	No	Yes	1.40E+02	No	No	<SGW
beta-BHC	ug/kg	10	10%	2.00E-01	2.00E-01	No	ND	--	No	3.00E+00	No	No	<SGW
bis(2-Ethylhexyl)phthalate	ug/kg	10	20%	9.65E+02	8.70E+03	No	ND	--	No	3.10E+07	No	No	<SGW
Cadmium	mg/kg	10	70%	3.33E-01	1.00E+00	No	6.87E+00	No	Yes	1.00E+01	No	No	<SGW
Calcium	mg/kg	10	100%	2.43E+04	1.30E+05	Yes	1.61E+04	Yes	Yes	NA	No	No	EN
Carbazole	ug/kg	10	10%	1.73E+02	8.20E+02	No	ND	--	No	2.80E+03	No	No	<SGW
Chromium	mg/kg	10	100%	1.22E+01	1.70E+01	No	3.27E+01	No	Yes	NA	No	No	<BK
Chrysene	ug/kg	10	40%	1.18E+03	1.10E+04	No	8.40E+01	Yes	No	8.00E+05	No	No	<SGW
Cobalt	mg/kg	10	100%	5.06E+00	6.10E+00	No	1.39E+01	No	Yes	NA	No	No	<BK
Copper	mg/kg	10	100%	1.16E+01	3.00E+01	No	1.55E+02	No	Yes	3.30E+02	No	No	<SGW
delta-BHC	ug/kg	10	20%	1.75E-01	2.30E-01	No	ND	--	No	3.00E+00	No	No	<SGW
Dibenzo(a,h)anthracene	ug/kg	10	10%	2.39E+02	1.90E+03	No	ND	--	No	7.60E+03	No	No	<SGW
Dibenzofuran	ug/kg	10	10%	2.01E+02	1.10E+03	No	ND	--	No	NA	No	No	NA
Dieldrin	ug/kg	10	10%	1.30E+00	1.30E+00	No	ND	--	No	2.00E+01	No	No	<SGW
Endosulfan sulfate	ug/kg	10	10%	1.00E+00	1.00E+00	No	ND	--	No	9.00E+04	No	No	<SGW
Endrin ketone	ug/kg	10	10%	2.90E-01	2.90E-01	No	ND	--	No	5.00E+03	No	No	<SGW
Fluoranthene	ug/kg	10	30%	2.39E+03	2.30E+04	No	8.40E+01	Yes	No	2.10E+07	No	No	<SGW
Fluorene	ug/kg	10	10%	2.91E+02	2.00E+03	No	ND	--	No	2.80E+06	No	No	<SGW
Indeno(1,2,3-cd)pyrene	ug/kg	10	10%	4.41E+02	3.50E+03	No	ND	--	No	6.90E+04	No	No	<SGW
Iron	mg/kg	10	100%	1.13E+04	1.60E+04	Yes	3.33E+04	No	Yes	NA	No	No	EN
Lead	mg/kg	10	100%	2.36E+01	1.30E+02	No	1.42E+02	No	Yes	NA	No	No	<BK
Magnesium	mg/kg	10	100%	6.15E+03	1.10E+04	Yes	9.33E+03	Yes	Yes	NA	No	No	EN
Manganese	mg/kg	10	100%	2.59E+02	3.55E+02	No	8.00E+02	No	Yes	NA	No	No	<BK
Mercury	mg/kg	10	80%	1.54E-02	3.90E-02	No	5.61E-02	No	Yes	5.00E-02	No	No	<SGW

Suburface Soil - Soil-to-Groundwater TACO Screen
Transect 4

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Subsurface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Methoxychlor	ug/kg	10	10%	7.60E+00	7.60E+00	No	ND	--	No	7.80E+05	No	No	<SGW
Molybdenum	mg/kg	10	100%	4.07E-01	7.60E-01	No	1.75E+00	No	Yes	NA	No	No	<BK
Naphthalene	ug/kg	10	10%	6.40E+01	6.40E+01	No	ND	--	No	4.20E+05	No	No	<SGW
Nickel	mg/kg	10	100%	1.43E+01	1.80E+01	No	3.73E+01	No	Yes	4.00E+02	No	No	<SGW
Pentachlorophenol	ug/kg	10	50%	3.05E+02	5.53E+02	No	ND	--	No	1.00E+02	Yes	Yes	>SGW
Phenanthrene	ug/kg	10	30%	1.48E+03	1.40E+04	No	ND	--	No	5.90E+07	No	No	<SGW
Potassium	mg/kg	10	100%	1.24E+03	1.70E+03	Yes	4.20E+03	No	Yes	NA	No	No	EN
Pyrene	ug/kg	10	30%	1.89E+03	1.80E+04	No	ND	--	No	2.10E+07	No	No	<SGW
Sodium	mg/kg	10	40%	1.17E+02	3.80E+02	Yes	3.53E+02	Yes	Yes	NA	No	No	EN
Toluene	ug/kg	10	10%	3.13E+00	4.80E+00	No	ND	--	No	2.90E+04	No	No	<SGW
Total PCBs	ug/kg	10	50%	1.83E+01	5.39E+01	No	ND	--	No	NA	No	No	NA
Vanadium	mg/kg	10	100%	1.93E+01	2.60E+01	No	5.80E+01	No	Yes	NA	No	No	<BK
Zinc	mg/kg	10	100%	5.81E+01	1.90E+02	No	6.41E+02	No	Yes	2.00E+03	No	No	<SGW

Suburface Soil - Soil-to-Groundwater TACO Screen
Transect 5

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Subsurface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Total 2,3,7,8-TCDD TEQ	ug/kg	2	100%	2.10E-05	3.50E-05	No	ND	--	No	NA	No	No	NA
2,4-DB	ug/kg	9	11%	4.96E+00	7.70E+00	No	ND	--	No	NA	No	No	NA
2-Butanone (MEK)	ug/kg	9	11%	1.30E+01	1.30E+01	No	ND	--	No	NA	No	No	NA
Acetone	ug/kg	9	11%	4.21E+01	1.40E+02	No	1.10E+01	Yes	No	1.60E+04	No	No	<SGW
Aluminum	mg/kg	9	100%	5.96E+03	9.60E+03	No	2.03E+04	No	Yes	NA	No	No	<BK
Arsenic	mg/kg	9	100%	4.91E+00	6.40E+00	No	1.74E+01	No	Yes	1.00E+02	No	No	<SGW
Barium	mg/kg	9	100%	1.70E+02	2.10E+02	No	3.73E+02	No	Yes	2.60E+02	No	No	<SGW
Benzene	ug/kg	9	11%	9.80E-01	9.80E-01	No	ND	--	No	1.70E+02	No	No	<SGW
Benzo(b)fluoranthene	ug/kg	9	11%	7.50E+01	7.50E+01	No	ND	--	No	2.50E+04	No	No	<SGW
Benzo(g,h,i)perylene	ug/kg	9	11%	3.00E+01	3.00E+01	No	6.80E+01	No	Yes	2.10E+07	No	No	<SGW
Beryllium	mg/kg	9	100%	3.73E-01	5.60E-01	No	1.27E+00	No	Yes	1.40E+02	No	No	<SGW
bis(2-Ethylhexyl)phthalate	ug/kg	9	56%	9.87E+01	1.20E+02	No	ND	--	No	3.10E+07	No	No	<SGW
Cadmium	mg/kg	9	100%	2.24E-01	3.40E-01	No	6.87E+00	No	Yes	1.00E+01	No	No	<SGW
Calcium	mg/kg	9	100%	1.38E+04	1.90E+04	Yes	1.61E+04	Yes	Yes	NA	No	No	EN
Chromium	mg/kg	9	100%	1.20E+01	2.00E+01	No	3.27E+01	No	Yes	NA	No	No	<BK
Cobalt	mg/kg	9	100%	5.03E+00	6.10E+00	No	1.39E+01	No	Yes	NA	No	No	<BK
Copper	mg/kg	9	100%	9.20E+00	1.60E+01	No	1.55E+02	No	Yes	3.30E+02	No	No	<SGW
Dibenzo(a,h)anthracene	ug/kg	9	11%	5.52E+01	9.45E+01	No	ND	--	No	7.60E+03	No	No	<SGW
Di-n-octylphthalate	ug/kg	9	11%	9.86E+01	1.18E+02	No	ND	--	No	1.00E+07	No	No	<SGW
Indeno(1,2,3-cd)pyrene	ug/kg	9	11%	9.81E+01	1.13E+02	No	ND	--	No	6.90E+04	No	No	<SGW
Iron	mg/kg	9	100%	1.10E+04	1.50E+04	Yes	3.33E+04	No	Yes	NA	No	No	EN
Lead	mg/kg	9	100%	8.11E+00	1.10E+01	No	1.42E+02	No	Yes	NA	No	No	<BK
Magnesium	mg/kg	9	100%	5.47E+03	7.40E+03	Yes	9.33E+03	No	Yes	NA	No	No	EN
Manganese	mg/kg	9	100%	2.39E+02	3.20E+02	No	8.00E+02	No	Yes	NA	No	No	<BK
MCPA	ug/kg	9	11%	1.24E+03	2.30E+03	No	ND	--	No	NA	No	No	NA
MCPP	ug/kg	9	22%	1.49E+03	2.90E+03	No	4.73E+03	No	Yes	NA	No	No	<BK
Mercury	mg/kg	9	100%	2.43E-02	8.60E-02	No	5.61E-02	Yes	No	5.00E-02	Yes	Yes	>SGW
Molybdenum	mg/kg	9	89%	2.97E-01	4.50E-01	No	1.75E+00	No	Yes	NA	No	No	<BK
Nickel	mg/kg	9	100%	1.39E+01	1.70E+01	No	3.73E+01	No	Yes	4.00E+02	No	No	<SGW
Potassium	mg/kg	9	100%	1.23E+03	1.80E+03	Yes	4.20E+03	No	Yes	NA	No	No	EN
Sodium	mg/kg	9	33%	8.23E+01	1.60E+02	Yes	3.53E+02	No	Yes	NA	No	No	EN
Toluene	ug/kg	9	11%	1.80E+00	1.80E+00	No	ND	--	No	2.90E+04	No	No	<SGW
Vanadium	mg/kg	9	100%	1.86E+01	2.60E+01	No	5.80E+01	No	Yes	NA	No	No	<BK
Zinc	mg/kg	9	100%	3.98E+01	5.60E+01	No	6.41E+02	No	Yes	2.00E+03	No	No	<SGW

G-23

Suburface Soil - Soil-to-Groundwater TACO Screen
Transect 6

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Subsurface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Total 2,3,7,8-TCDD TEQ	ug/kg	2	100%	7.84E-04	1.51E-03	No	ND	--	No	NA	No	No	NA
2-Hexanone	ug/kg	8	13%	3.50E+00	3.50E+00	No	ND	--	No	NA	No	No	NA
Acenaphthene	ug/kg	8	25%	1.00E+02	1.60E+02	No	ND	--	No	2.90E+06	No	No	<SGW
Acenaphthylene	ug/kg	8	13%	4.90E+01	4.90E+01	No	ND	--	No	2.90E+06	No	No	<SGW
Acetone	ug/kg	8	13%	3.04E+01	4.00E+01	No	1.10E+01	Yes	No	1.60E+04	No	No	<SGW
Aluminum	mg/kg	8	100%	7.90E+03	1.20E+04	No	2.03E+04	No	Yes	NA	No	No	<BK
Anthracene	ug/kg	8	38%	1.26E+02	3.60E+02	No	ND	--	No	5.90E+07	No	No	<SGW
Antimony	mg/kg	8	25%	1.32E+00	2.60E+00	No	2.40E+00	Yes	No	2.00E+01	No	No	<SGW
Arsenic	mg/kg	8	100%	6.20E+00	7.80E+00	No	1.74E+01	No	Yes	1.00E+02	No	No	<SGW
Barium	mg/kg	8	100%	1.95E+02	2.20E+02	No	3.73E+02	No	Yes	2.60E+02	No	No	<SGW
Benzene	ug/kg	8	13%	2.77E+00	3.00E+00	No	ND	--	No	1.70E+02	No	No	<SGW
Benzo(a)anthracene	ug/kg	8	50%	2.25E+02	9.40E+02	No	5.20E+01	Yes	No	8.00E+03	No	No	<SGW
Benzo(a)pyrene	ug/kg	8	25%	1.85E+02	8.80E+02	No	ND	--	No	8.20E+04	No	No	<SGW
Benzo(b)fluoranthene	ug/kg	8	38%	1.93E+02	6.40E+02	No	ND	--	No	2.50E+04	No	No	<SGW
Benzo(g,h,i)perylene	ug/kg	8	13%	1.66E+02	6.30E+02	No	6.80E+01	Yes	No	2.10E+07	No	No	<SGW
Benzo(k)fluoranthene	ug/kg	8	25%	2.40E+02	1.10E+03	No	ND	--	No	2.50E+05	No	No	<SGW
Beryllium	mg/kg	8	100%	4.84E-01	6.30E-01	No	1.27E+00	No	Yes	1.40E+02	No	No	<SGW
bis(2-Ethylhexyl)phthalate	ug/kg	8	38%	1.25E+02	2.70E+02	No	ND	--	No	3.10E+07	No	No	<SGW
Cadmium	mg/kg	8	100%	5.54E-01	9.60E-01	No	6.87E+00	No	Yes	1.00E+01	No	No	<SGW
Calcium	mg/kg	8	100%	2.60E+04	6.40E+04	Yes	1.61E+04	Yes	Yes	NA	No	No	EN
Carbazole	ug/kg	8	25%	1.01E+02	1.70E+02	No	ND	--	No	2.80E+03	No	No	<SGW
Chromium	mg/kg	8	100%	1.44E+01	2.10E+01	No	3.27E+01	No	Yes	NA	No	No	<BK
Chrysene	ug/kg	8	50%	2.52E+02	1.10E+03	No	8.40E+01	Yes	No	8.00E+05	No	No	<SGW
Cobalt	mg/kg	8	100%	6.31E+00	8.60E+00	No	1.39E+01	No	Yes	NA	No	No	<BK
Copper	mg/kg	8	100%	1.88E+01	3.50E+01	No	1.55E+02	No	Yes	3.30E+02	No	No	<SGW
delta-BHC	ug/kg	8	13%	1.40E-01	1.40E-01	No	ND	--	No	3.00E+00	No	No	<SGW
Dibenzo(a,h)anthracene	ug/kg	8	25%	8.46E+01	2.70E+02	No	ND	--	No	7.60E+03	No	No	<SGW
Dibenzofuran	ug/kg	8	13%	1.02E+02	1.20E+02	No	ND	--	No	NA	No	No	NA
Endosulfan sulfate	ug/kg	8	25%	5.00E-01	5.80E-01	No	ND	--	No	9.00E+04	No	No	<SGW
Fluoranthene	ug/kg	8	50%	4.97E+02	2.50E+03	No	8.40E+01	Yes	No	2.10E+07	No	No	<SGW
Fluorene	ug/kg	8	25%	9.39E+01	1.30E+02	No	ND	--	No	2.80E+06	No	No	<SGW
Indeno(1,2,3-cd)pyrene	ug/kg	8	38%	1.64E+02	5.70E+02	No	ND	--	No	6.90E+04	No	No	<SGW
Iron	mg/kg	8	100%	1.40E+04	1.80E+04	Yes	3.33E+04	No	Yes	NA	No	No	EN
Lead	mg/kg	8	100%	7.45E+01	2.40E+02	No	1.42E+02	Yes	No	NA	No	No	NA
Magnesium	mg/kg	8	100%	6.10E+03	6.90E+03	Yes	9.33E+03	No	Yes	NA	No	No	EN
Manganese	mg/kg	8	100%	3.21E+02	4.00E+02	No	8.00E+02	No	Yes	NA	No	No	<BK
MCPA[(4-chloro-2-methylpheno	ug/kg	8	13%	1.19E+03	1.40E+03	No	ND	--	No	NA	No	No	NA
MCPP	ug/kg	8	13%	1.39E+03	3.00E+03	No	4.73E+03	No	Yes	NA	No	No	<BK
Mercury	mg/kg	8	75%	5.86E-02	1.90E-01	No	5.61E-02	Yes	No	5.00E-02	Yes	Yes	>SGW

Suburface Soil - Soil-to-Groundwater TACO Screen
Transect 6

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Subsurface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Molybdenum	mg/kg	8	100%	6.06E-01	1.10E+00	No	1.75E+00	No	Yes	NA	No	No	<BK
Naphthalene	ug/kg	8	25%	4.50E+01	4.90E+01	No	ND	--	No	4.20E+05	No	No	<SGW
Nickel	mg/kg	8	100%	1.71E+01	2.40E+01	No	3.73E+01	No	Yes	4.00E+02	No	No	<SGW
Pentachlorophenol	ug/kg	8	25%	2.46E+02	2.51E+02	No	ND	--	No	1.00E+02	Yes	Yes	>SGW
Phenanthrene	ug/kg	8	50%	3.82E+02	1.90E+03	No	ND	--	No	5.90E+07	No	No	<SGW
Potassium	mg/kg	8	100%	1.43E+03	2.00E+03	Yes	4.20E+03	No	Yes	NA	No	No	EN
Pyrene	ug/kg	8	38%	4.59E+02	2.30E+03	No	ND	--	No	2.10E+07	No	No	<SGW
Sodium	mg/kg	8	38%	1.06E+02	1.40E+02	Yes	3.53E+02	No	Yes	NA	No	No	EN
Toluene	ug/kg	8	25%	3.45E+00	6.60E+00	No	ND	--	No	2.90E+04	No	No	<SGW
Total PCBs	ug/kg	8	13%	4.30E+00	4.30E+00	No	ND	--	No	NA	No	No	NA
Vanadium	mg/kg	8	100%	2.38E+01	3.30E+01	No	5.80E+01	No	Yes	NA	No	No	<BK
Xylenes, Total	ug/kg	8	13%	3.22E+00	4.30E+00	No	ND	--	No	1.50E+05	No	No	<SGW
Zinc	mg/kg	8	100%	8.26E+01	1.60E+02	No	6.41E+02	No	Yes	2.00E+03	No	No	<SGW

G-25

Subsurface Soil - Soil-to-Groundwater TACO Screen
Transect 7

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Subsurface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Total 2,3,7,8-TCDD TEQ	ug/kg	1	100%	2.00E-05	2.00E-05	No	ND	--	No	NA	No	No	NA
2-Butanone (MEK)	ug/kg	9	22%	9.50E+00	1.20E+01	No	ND	--	No	NA	No	No	NA
4,4'-DDE	ug/kg	9	22%	1.02E+00	1.70E+00	No	ND	--	No	2.70E+05	No	No	<SGW
Acetone	ug/kg	9	33%	8.78E+01	3.10E+02	No	1.10E+01	Yes	No	1.60E+04	No	No	<SGW
Aluminum	mg/kg	9	100%	9.26E+03	2.20E+04	No	2.03E+04	Yes	No	NA	No	No	NA
Antimony	mg/kg	9	22%	5.80E-01	6.00E-01	No	2.40E+00	No	Yes	2.00E+01	No	No	<SGW
Arsenic	mg/kg	9	100%	5.99E+00	1.10E+01	No	1.74E+01	No	Yes	1.00E+02	No	No	<SGW
Barium	mg/kg	9	100%	2.10E+02	2.90E+02	No	3.73E+02	No	Yes	2.60E+02	Yes	No	<BK
Benzene	ug/kg	9	22%	2.96E+00	3.20E+00	No	ND	--	No	1.70E+02	No	No	<SGW
Benzo(a)anthracene	ug/kg	9	22%	3.65E+01	3.70E+01	No	5.20E+01	No	Yes	8.00E+03	No	No	<SGW
Benzo(a)pyrene	ug/kg	9	22%	3.60E+01	3.80E+01	No	ND	--	No	8.20E+04	No	No	<SGW
Benzo(b)fluoranthene	ug/kg	9	22%	3.25E+01	3.70E+01	No	ND	--	No	2.50E+04	No	No	<SGW
Benzo(g,h,i)perylene	ug/kg	9	22%	3.55E+01	3.60E+01	No	6.80E+01	No	Yes	2.10E+07	No	No	<SGW
Benzo(k)fluoranthene	ug/kg	9	11%	3.60E+01	3.60E+01	No	ND	--	No	2.50E+05	No	No	<SGW
Beryllium	mg/kg	9	33%	4.33E-01	1.20E+00	No	1.27E+00	No	Yes	1.40E+02	No	No	<SGW
bis(2-Ethylhexyl)phthalate	ug/kg	9	78%	1.08E+03	7.60E+03	No	ND	--	No	3.10E+07	No	No	<SGW
Cadmium	mg/kg	9	100%	1.78E+00	7.90E+00	No	6.87E+00	Yes	No	1.00E+01	No	No	<SGW
Calcium	mg/kg	9	100%	1.20E+04	1.70E+04	Yes	1.61E+04	Yes	Yes	NA	No	No	EN
Carbon disulfide	ug/kg	9	33%	4.19E+00	7.80E+00	No	ND	--	No	1.60E+05	No	No	<SGW
Chlorobenzene	ug/kg	9	22%	4.10E+00	1.00E+01	No	ND	--	No	6.50E+03	No	No	<SGW
Chromium	mg/kg	9	100%	3.35E+01	1.30E+02	No	3.27E+01	Yes	No	NA	No	No	NA
Chrysene	ug/kg	9	22%	4.55E+01	4.80E+01	No	8.40E+01	No	Yes	8.00E+05	No	No	<SGW
Cobalt	mg/kg	9	100%	6.50E+00	1.10E+01	No	1.39E+01	No	Yes	NA	No	No	<BK
Copper	mg/kg	9	100%	1.96E+01	6.20E+01	No	1.55E+02	No	Yes	3.30E+02	No	No	<SGW
Di-n-butylphthalate	ug/kg	9	67%	8.91E+01	1.20E+02	No	ND	--	No	2.30E+06	No	No	<SGW
Endosulfan sulfate	ug/kg	9	22%	4.45E-01	5.70E-01	No	ND	--	No	9.00E+04	No	No	<SGW
Fluoranthene	ug/kg	9	22%	7.95E+01	8.10E+01	No	8.40E+01	No	Yes	2.10E+07	No	No	<SGW
Iron	mg/kg	9	100%	1.39E+04	2.60E+04	Yes	3.33E+04	No	Yes	NA	No	No	EN
Lead	mg/kg	9	100%	2.24E+01	7.70E+01	No	1.42E+02	No	Yes	NA	No	No	<BK
Magnesium	mg/kg	9	100%	5.87E+03	7.10E+03	Yes	9.33E+03	No	Yes	NA	No	No	EN
Manganese	mg/kg	9	100%	2.59E+02	4.00E+02	No	8.00E+02	No	Yes	NA	No	No	<BK
Mercury	mg/kg	9	89%	6.20E-02	2.90E-01	No	5.61E-02	Yes	No	5.00E-02	Yes	Yes	>SGW
Molybdenum	mg/kg	9	67%	4.93E-01	7.85E-01	No	1.75E+00	No	Yes	NA	No	No	<BK
Nickel	mg/kg	9	100%	2.07E+01	4.20E+01	No	3.73E+01	Yes	No	4.00E+02	No	No	<SGW
Pentachlorophenol	ug/kg	9	33%	2.58E+02	3.01E+02	No	ND	--	No	1.00E+02	Yes	Yes	>SGW
Phenanthrene	ug/kg	9	22%	3.65E+01	4.20E+01	No	ND	--	No	5.90E+07	No	No	<SGW
Potassium	mg/kg	9	100%	1.88E+03	4.00E+03	Yes	4.20E+03	No	Yes	NA	No	No	EN
Pyrene	ug/kg	9	11%	6.00E+01	6.00E+01	No	ND	--	No	2.10E+07	No	No	<SGW
Sodium	mg/kg	9	33%	1.18E+02	2.60E+02	Yes	3.53E+02	No	Yes	NA	No	No	EN

Suburface Soil - Soil-to-Groundwater TACO Screen
Transect 7

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Subsurface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Thallium	mg/kg	9	11%	5.74E-01	7.20E-01	No	ND	--	No	1.60E+01	No	No	<SGW
Toluene	ug/kg	9	11%	3.49E+00	5.40E+00	No	ND	--	No	2.90E+04	No	No	<SGW
Total PCBs	ug/kg	9	11%	8.40E+00	8.40E+00	No	ND	--	No	NA	No	No	NA
Vanadium	mg/kg	9	100%	2.52E+01	5.00E+01	No	5.80E+01	No	Yes	NA	No	No	<BK
Zinc	mg/kg	9	100%	3.79E+02	1.80E+03	No	6.41E+02	Yes	No	2.00E+03	No	No	<SGW

G-27

Fill Area - Soil-to-Groundwater TACO Screen
Area G

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Total 2,3,7,8-TCDD TEQ	ug/kg	4	100%	3.05E-03	8.35E-03	No	ND	--	No	NA	No	No	NA
4,4'-DDT	ug/kg	4	75%	1.15E-01	1.60E-01	No	1.41E+01	No	Yes	1.60E+05	No	No	<SGW
Alpha Chlordane	ug/kg	4	50%	1.90E-01	2.60E-01	No	ND	--	No	4.80E+04	No	No	<SGW
Aluminum	mg/kg	4	100%	1.30E+04	1.50E+04	No	2.54E+04	No	Yes	NA	No	No	<BK
Antimony	mg/kg	4	50%	6.85E-01	7.20E-01	No	3.80E+00	No	Yes	2.00E+01	No	No	<SGW
Arsenic	mg/kg	4	100%	7.19E+00	8.05E+00	No	1.91E+01	No	Yes	1.00E+02	No	No	<SGW
Barium	mg/kg	4	100%	1.17E+02	1.40E+02	No	3.63E+02	No	Yes	2.60E+02	No	No	<SGW
Beryllium	mg/kg	4	100%	5.89E-01	6.40E-01	No	1.51E+00	No	Yes	1.40E+02	No	No	<SGW
Cadmium	mg/kg	4	100%	2.60E-01	3.90E-01	No	8.65E+00	No	Yes	1.00E+01	No	No	<SGW
Calcium	mg/kg	4	100%	9.73E+03	1.40E+04	Yes	3.35E+04	No	Yes	NA	No	No	EN
Chromium	mg/kg	4	100%	1.93E+01	2.20E+01	No	3.93E+01	No	Yes	NA	No	No	<BK
Cobalt	mg/kg	4	100%	7.33E+00	8.60E+00	No	1.55E+01	No	Yes	NA	No	No	<BK
Copper	mg/kg	4	100%	1.83E+02	2.90E+02	No	2.09E+02	Yes	No	3.30E+02	No	No	<SGW
delta-BHC	ug/kg	4	75%	1.03E-01	1.82E-01	No	ND	--	No	3.00E+00	No	No	<SGW
Dieldrin	ug/kg	4	25%	6.20E-02	6.20E-02	No	ND	--	No	2.00E+01	No	No	<SGW
Endosulfan I	ug/kg	4	25%	2.20E-01	2.20E-01	No	ND	--	No	9.00E+04	No	No	<SGW
Endosulfan II	ug/kg	4	25%	3.40E-01	3.40E-01	No	ND	--	No	9.00E+04	No	No	<SGW
Endosulfan sulfate	ug/kg	4	50%	1.50E-01	1.80E-01	No	ND	--	No	9.00E+04	No	No	<SGW
Endrin	ug/kg	4	50%	1.48E-01	1.55E-01	No	ND	--	No	5.00E+03	No	No	<SGW
Endrin aldehyde	ug/kg	4	50%	3.95E-01	6.70E-01	No	ND	--	No	5.00E+03	No	No	<SGW
Endrin ketone	ug/kg	4	50%	9.10E-01	1.03E+00	No	ND	--	No	5.00E+03	No	No	<SGW
Gamma Chlordane	ug/kg	4	75%	2.02E-01	3.10E-01	No	ND	--	No	4.80E+04	No	No	<SGW
Heptachlor epoxide	ug/kg	4	25%	2.20E-01	2.20E-01	No	ND	--	No	3.30E+03	No	No	<SGW
Iron	mg/kg	4	100%	1.84E+04	2.00E+04	Yes	3.80E+04	No	Yes	NA	No	No	EN
Lead	mg/kg	4	100%	1.36E+01	1.60E+01	No	1.85E+02	No	Yes	NA	No	No	<BK
Magnesium	mg/kg	4	100%	4.09E+03	4.95E+03	Yes	1.72E+04	No	Yes	NA	No	No	EN
Manganese	mg/kg	4	100%	5.44E+02	7.40E+02	No	8.83E+02	No	Yes	NA	No	No	<BK
Mercury	mg/kg	4	100%	2.45E-02	2.90E-02	No	1.77E-01	No	Yes	5.00E-02	No	No	<SGW
Methoxychlor	ug/kg	4	25%	9.40E-01	9.40E-01	No	ND	--	No	7.80E+05	No	No	<SGW
Molybdenum	mg/kg	4	100%	5.19E-01	7.80E-01	No	2.02E+00	No	Yes	NA	No	No	<BK
Nickel	mg/kg	4	100%	1.89E+01	2.15E+01	No	4.27E+01	No	Yes	4.00E+02	No	No	<SGW
Potassium	mg/kg	4	100%	1.45E+03	1.70E+03	Yes	4.73E+03	No	Yes	NA	No	No	EN
Total PCBs	ug/kg	4	50%	1.81E+01	4.65E+01	No	See notes	--	No	NA	No	No	NA
Vanadium	mg/kg	4	100%	3.58E+01	4.00E+01	No	6.90E+01	No	Yes	NA	No	No	<BK
Zinc	mg/kg	4	100%	6.09E+01	6.95E+01	No	8.08E+02	No	Yes	2.00E+03	No	No	<SGW

Fill Area - Soil-to-Groundwater TACO Screen
Area H

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Total 2,3,7,8-TCDD TEQ	ug/kg	4	100%	5.33E-01	1.29E+00	No	ND	--	No	NA	No	No	NA
2,4-DB	ug/kg	4	50%	6.74E+00	9.70E+00	No	ND	--	No	NA	No	No	NA
2-Hexanone	ug/kg	4	25%	5.70E+00	5.70E+00	No	3.30E+01	No	Yes	NA	No	No	<BK
4,4'-DDE	ug/kg	4	75%	3.44E+01	8.60E+01	No	1.61E+01	Yes	No	2.70E+05	No	No	<SGW
4,4'-DDT	ug/kg	4	75%	4.51E+01	1.10E+02	No	1.41E+01	Yes	No	1.60E+05	No	No	<SGW
Aldrin	ug/kg	4	50%	8.21E+00	2.10E+01	No	ND	--	No	2.50E+03	No	No	<SGW
Aluminum	mg/kg	4	100%	7.95E+03	1.40E+04	No	2.54E+04	No	Yes	NA	No	No	<BK
Antimony	mg/kg	4	100%	1.57E+00	2.30E+00	No	3.80E+00	No	Yes	2.00E+01	No	No	<SGW
Arsenic	mg/kg	4	100%	2.28E+01	6.40E+01	No	1.91E+01	Yes	No	1.00E+02	No	No	<SGW
Barium	mg/kg	4	100%	1.12E+02	1.20E+02	No	3.63E+02	No	Yes	2.60E+02	No	No	<SGW
Benzo(a)anthracene	ug/kg	4	75%	1.04E+02	1.30E+02	No	2.40E+02	No	Yes	8.00E+03	No	No	<SGW
Benzo(a)pyrene	ug/kg	4	75%	9.93E+01	1.40E+02	No	1.87E+02	No	Yes	8.20E+04	No	No	<SGW
Benzo(b)fluoranthene	ug/kg	4	75%	1.13E+02	1.40E+02	No	1.79E+02	No	Yes	2.50E+04	No	No	<SGW
Benzo(g,h,i)perylene	ug/kg	4	25%	1.61E+02	3.70E+02	No	1.27E+02	Yes	No	2.10E+07	No	No	<SGW
Benzo(k)fluoranthene	ug/kg	4	75%	9.68E+01	1.30E+02	No	2.08E+02	No	Yes	2.50E+05	No	No	<SGW
Beryllium	mg/kg	4	100%	1.52E+00	3.80E+00	No	1.51E+00	Yes	No	1.40E+02	No	No	<SGW
bis(2-Ethylhexyl)phthalate	ug/kg	4	50%	1.04E+02	1.20E+02	No	3.22E+02	No	Yes	3.10E+07	No	No	<SGW
Cadmium	mg/kg	4	100%	9.03E+00	2.20E+01	No	8.65E+00	Yes	No	1.00E+01	Yes	Yes	>SGW
Calcium	mg/kg	4	100%	1.76E+04	4.20E+04	Yes	3.35E+04	Yes	Yes	NA	No	No	EN
Carbon disulfide	ug/kg	4	25%	3.42E+00	4.30E+00	No	ND	--	No	1.60E+05	No	No	<SGW
Chromium	mg/kg	4	100%	1.95E+01	2.30E+01	No	3.93E+01	No	Yes	NA	No	No	<BK
Chrysene	ug/kg	4	75%	1.58E+02	3.00E+02	No	2.73E+02	Yes	No	8.00E+05	No	No	<SGW
Cobalt	mg/kg	4	100%	1.00E+01	2.00E+01	No	1.55E+01	Yes	No	NA	No	No	NA
Copper	mg/kg	4	100%	3.75E+02	4.80E+02	No	2.09E+02	Yes	No	3.30E+02	Yes	Yes	>SGW
Endosulfan II	ug/kg	4	25%	3.57E+00	7.20E+00	No	ND	--	No	9.00E+04	No	No	<SGW
Endrin ketone	ug/kg	4	75%	2.50E+01	8.20E+01	No	ND	--	No	5.00E+03	No	No	<SGW
Fluoranthene	ug/kg	4	75%	1.70E+02	2.40E+02	No	5.02E+02	No	Yes	2.10E+07	No	No	<SGW
Gamma Chlordane	ug/kg	4	50%	1.47E+01	3.00E+01	No	ND	--	No	4.80E+04	No	No	<SGW
Heptachlor	ug/kg	4	25%	1.28E+00	2.00E+00	No	ND	--	No	1.10E+05	No	No	<SGW
Heptachlor epoxide	ug/kg	4	75%	1.64E+01	4.40E+01	No	ND	--	No	3.30E+03	No	No	<SGW
Indeno(1,2,3-cd)pyrene	ug/kg	4	50%	9.18E+01	1.00E+02	No	ND	--	No	6.90E+04	No	No	<SGW
Iron	mg/kg	4	100%	1.63E+04	1.80E+04	Yes	3.80E+04	No	Yes	NA	No	No	EN
Lead	mg/kg	4	100%	1.46E+02	2.30E+02	No	1.85E+02	Yes	No	NA	No	No	NA
Magnesium	mg/kg	4	100%	2.02E+03	2.50E+03	Yes	1.72E+04	No	Yes	NA	No	No	EN
Manganese	mg/kg	4	100%	4.37E+02	7.20E+02	No	8.83E+02	No	Yes	NA	No	No	<BK
Mercury	mg/kg	4	100%	2.84E-01	7.70E-01	No	1.77E-01	Yes	No	5.00E-02	Yes	Yes	>SGW
Methoxychlor	ug/kg	4	50%	4.54E+01	1.30E+02	No	ND	--	No	7.80E+05	No	No	<SGW
Molybdenum	mg/kg	4	100%	4.95E+00	1.10E+01	No	2.02E+00	Yes	No	NA	No	No	NA
Nickel	mg/kg	4	100%	3.40E+01	7.00E+01	No	4.27E+01	Yes	No	4.00E+02	No	No	<SGW

Fill Area - Soil-to-Groundwater TACO Screen
Area H

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Pentachlorophenol	ug/kg	4	25%	2.32E+02	2.41E+02	No	See notes	--	No	1.00E+02	Yes	Yes	>SGW
Phenanthrene	ug/kg	4	25%	9.63E+01	1.10E+02	No	3.35E+02	No	Yes	5.90E+07	No	No	<SGW
Potassium	mg/kg	4	100%	1.16E+03	1.60E+03	Yes	4.73E+03	No	Yes	NA	No	No	EN
Pyrene	ug/kg	4	75%	1.58E+02	1.90E+02	No	4.35E+02	No	Yes	2.10E+07	No	No	<SGW
Selenium	mg/kg	4	75%	1.58E+00	4.70E+00	No	ND	--	No	2.40E+00	Yes	Yes	>SGW
Silver	mg/kg	4	75%	1.39E+00	2.70E+00	No	1.35E+00	Yes	No	NA	No	No	NA
Sodium	mg/kg	4	100%	2.48E+02	3.90E+02	Yes	5.77E+02	No	Yes	NA	No	No	EN
Tetrachloroethene	ug/kg	4	25%	6.73E+00	1.70E+01	No	ND	--	No	3.00E+02	No	No	<SGW
Thallium	mg/kg	4	25%	1.01E+00	2.50E+00	No	ND	--	No	1.60E+01	No	No	<SGW
Total PCBs	ug/kg	4	75%	6.60E+02	1.52E+03	No	See notes	--	No	NA	No	No	NA
Vanadium	mg/kg	4	100%	3.00E+01	4.50E+01	No	6.90E+01	No	Yes	NA	No	No	<BK
Zinc	mg/kg	4	100%	1.28E+03	3.60E+03	No	8.08E+02	Yes	No	2.00E+03	Yes	Yes	>SGW

G-30

Fill Area - Soil-to-Groundwater TACO Screen
Area I

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
1,2,4-Trichlorobenzene	ug/kg	4	25%	1.11E+02	1.80E+02	No	ND	--	No	5.30E+04	No	No	<SGW
1,4-Dichlorobenzene	ug/kg	4	25%	4.60E+01	4.60E+01	No	ND	--	No	1.10E+04	No	No	<SGW
Total 2,3,7,8-TCDD TEQ	ug/kg	4	100%	3.34E+00	1.27E+01	No	ND	--	No	NA	No	No	NA
2,4-DB	ug/kg	4	25%	1.27E+01	2.91E+01	No	ND	--	No	NA	No	No	NA
2,4-Dichlorophenol	ug/kg	4	25%	8.20E+01	8.20E+01	No	ND	--	No	6.90E+02	No	No	<SGW
2-Nitroaniline	ug/kg	4	25%	1.60E+02	1.60E+02	No	ND	--	No	NA	No	No	NA
4,4'-DDD	ug/kg	3	100%	6.69E+01	2.00E+02	No	ND	--	No	8.00E+04	No	No	<SGW
4,4'-DDE	ug/kg	3	100%	1.03E+02	3.00E+02	No	1.61E+01	Yes	No	2.70E+05	No	No	<SGW
4,4'-DDT	ug/kg	3	67%	1.57E+02	4.60E+02	No	1.41E+01	Yes	No	1.60E+05	No	No	<SGW
4-Chloroaniline	ug/kg	4	50%	4.64E+03	1.80E+04	No	ND	--	No	7.00E+02	Yes	Yes	>SGW
Aldrin	ug/kg	3	100%	8.48E+01	2.50E+02	No	ND	--	No	2.50E+03	No	No	<SGW
Alpha Chlordane	ug/kg	3	33%	2.65E+00	2.65E+00	No	ND	--	No	4.80E+04	No	No	<SGW
Aluminum	mg/kg	4	100%	5.64E+03	8.00E+03	No	2.54E+04	No	Yes	NA	No	No	<BK
Anthracene	ug/kg	4	50%	2.36E+02	7.30E+02	No	1.60E+02	Yes	No	5.90E+07	No	No	<SGW
Antimony	mg/kg	4	100%	6.06E+00	8.40E+00	No	3.80E+00	Yes	No	2.00E+01	No	No	<SGW
Arsenic	mg/kg	4	100%	7.79E+00	1.20E+01	No	1.91E+01	No	Yes	1.00E+02	No	No	<SGW
Barium	mg/kg	4	100%	2.81E+02	7.40E+02	No	3.63E+02	Yes	No	2.60E+02	Yes	Yes	>SGW
Benzo(a)anthracene	ug/kg	4	75%	6.53E+02	2.20E+03	No	2.40E+02	Yes	No	8.00E+03	No	No	<SGW
Benzo(a)pyrene	ug/kg	4	75%	6.29E+02	2.20E+03	No	1.87E+02	Yes	No	8.20E+04	No	No	<SGW
Benzo(b)fluoranthene	ug/kg	4	75%	8.14E+02	2.80E+03	No	1.79E+02	Yes	No	2.50E+04	No	No	<SGW
Benzo(g,h,i)perylene	ug/kg	4	75%	4.86E+02	1.60E+03	No	1.27E+02	Yes	No	2.10E+07	No	No	<SGW
Benzo(k)fluoranthene	ug/kg	4	75%	3.10E+02	9.60E+02	No	2.08E+02	Yes	No	2.50E+05	No	No	<SGW
Beryllium	mg/kg	4	100%	9.10E-01	1.70E+00	No	1.51E+00	Yes	No	1.40E+02	No	No	<SGW
bis(2-Ethylhexyl)phthalate	ug/kg	4	25%	8.75E+01	8.75E+01	No	3.22E+02	No	Yes	3.10E+07	No	No	<SGW
Cadmium	mg/kg	4	100%	1.12E+01	3.10E+01	No	8.65E+00	Yes	No	1.00E+01	Yes	Yes	>SGW
Calcium	mg/kg	4	100%	1.57E+05	2.35E+05	Yes	3.35E+04	Yes	Yes	NA	No	No	EN
Carbazole	ug/kg	4	25%	1.48E+02	3.20E+02	No	6.40E+01	Yes	No	2.80E+03	No	No	<SGW
Chromium	mg/kg	4	100%	3.33E+01	6.50E+01	No	3.93E+01	Yes	No	NA	No	No	NA
Chrysene	ug/kg	4	75%	6.62E+02	2.20E+03	No	2.73E+02	Yes	No	8.00E+05	No	No	<SGW
Cobalt	mg/kg	4	100%	1.21E+01	3.30E+01	No	1.55E+01	Yes	No	NA	No	No	NA
Copper	mg/kg	4	100%	6.66E+03	1.30E+04	No	2.09E+02	Yes	No	3.30E+02	Yes	Yes	>SGW
Dibenzo(a,h)anthracene	ug/kg	4	50%	1.23E+02	3.60E+02	No	ND	--	No	7.60E+03	No	No	<SGW
Dibenzofuran	ug/kg	4	25%	9.25E+01	1.00E+02	No	ND	--	No	NA	No	No	NA
Dieldrin	ug/kg	3	100%	7.04E+01	2.00E+02	No	ND	--	No	2.00E+01	Yes	Yes	>SGW
Di-n-butylphthalate	ug/kg	4	25%	5.20E+01	5.20E+01	No	3.12E+02	No	Yes	2.30E+06	No	No	<SGW
Endosulfan I	ug/kg	3	100%	8.88E+01	2.60E+02	No	ND	--	No	9.00E+04	No	No	<SGW
Endosulfan II	ug/kg	3	100%	2.06E+02	6.00E+02	No	ND	--	No	9.00E+04	No	No	<SGW
Endosulfan sulfate	ug/kg	3	33%	8.65E+00	8.80E+00	No	ND	--	No	9.00E+04	No	No	<SGW
Endrin	ug/kg	3	100%	8.22E+01	2.40E+02	No	ND	--	No	5.00E+03	No	No	<SGW
Endrin aldehyde	ug/kg	3	100%	5.15E+02	1.50E+03	No	ND	--	No	5.00E+03	No	No	<SGW

Fill Area - Soil-to-Groundwater TACO Screen
Area I

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Endrin ketone	ug/kg	3	100%	2.42E+02	7.00E+02	No	ND	--	No	5.00E+03	No	No	<SGW
Fluoranthene	ug/kg	4	100%	1.66E+03	6.00E+03	No	5.02E+02	Yes	No	2.10E+07	No	No	<SGW
Fluorene	ug/kg	4	25%	1.25E+02	2.30E+02	No	ND	--	No	2.80E+06	No	No	<SGW
Gamma Chlordane	ug/kg	3	100%	1.32E+02	3.80E+02	No	ND	--	No	4.80E+04	No	No	<SGW
Heptachlor	ug/kg	3	67%	2.48E+01	6.90E+01	No	ND	--	No	1.10E+05	No	No	<SGW
Heptachlor epoxide	ug/kg	3	100%	4.85E+01	1.40E+02	No	ND	--	No	3.30E+03	No	No	<SGW
Hexachlorobenzene	ug/kg	4	25%	5.48E+01	1.10E+02	No	ND	--	No	1.10E+04	No	No	<SGW
Indeno(1,2,3-cd)pyrene	ug/kg	4	50%	4.84E+02	1.60E+03	No	ND	--	No	6.90E+04	No	No	<SGW
Iron	mg/kg	4	100%	1.08E+04	1.60E+04	Yes	3.80E+04	No	Yes	NA	No	No	EN
Lead	mg/kg	4	100%	6.95E+02	1.50E+03	No	1.85E+02	Yes	No	NA	No	No	NA
Magnesium	mg/kg	4	100%	1.24E+04	1.90E+04	Yes	1.72E+04	Yes	Yes	NA	No	No	EN
Manganese	mg/kg	4	100%	2.03E+02	3.00E+02	No	8.83E+02	No	Yes	NA	No	No	<BK
Mercury	mg/kg	4	100%	6.04E-01	2.00E+00	No	1.77E-01	Yes	No	5.00E-02	Yes	Yes	>SGW
Methoxychlor	ug/kg	3	100%	1.03E+03	3.00E+03	No	ND	--	No	7.80E+05	No	No	<SGW
Molybdenum	mg/kg	4	100%	5.86E+00	8.50E+00	No	2.02E+00	Yes	No	NA	No	No	NA
Nickel	mg/kg	4	100%	3.54E+01	6.50E+01	No	4.27E+01	Yes	No	4.00E+02	No	No	<SGW
Pentachlorophenol	ug/kg	4	100%	6.34E+02	1.65E+03	No	See notes	--	No	1.00E+02	Yes	Yes	>SGW
Phenanthrene	ug/kg	4	100%	8.80E+02	3.30E+03	No	3.35E+02	Yes	No	5.90E+07	No	No	<SGW
Potassium	mg/kg	4	100%	1.24E+03	1.50E+03	Yes	4.73E+03	No	Yes	NA	No	No	EN
Pyrene	ug/kg	4	100%	1.35E+03	4.70E+03	No	4.35E+02	Yes	No	2.10E+07	No	No	<SGW
Selenium	mg/kg	4	75%	1.10E+00	1.60E+00	No	ND	--	No	2.40E+00	No	No	<SGW
Silver	mg/kg	4	100%	8.71E+00	1.90E+01	No	1.35E+00	Yes	No	NA	No	No	NA
Sodium	mg/kg	4	100%	6.35E+02	8.70E+02	Yes	5.77E+02	Yes	Yes	NA	No	No	EN
Toluene	ug/kg	4	25%	2.89E+00	3.30E+00	No	ND	--	No	2.90E+04	No	No	<SGW
Total PCBs	ug/kg	4	75%	3.13E+04	1.21E+05	No	See notes	--	No	NA	No	No	NA
Vanadium	mg/kg	4	100%	1.87E+01	2.60E+01	No	6.90E+01	No	Yes	NA	No	No	<BK
Zinc	mg/kg	4	100%	1.43E+03	2.80E+03	No	8.08E+02	Yes	No	2.00E+03	Yes	Yes	>SGW

Fill Area - Soil-to-Groundwater TACO Screen
Area L

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Total 2,3,7,8-TCDD TEQ	ug/kg	4	100%	3.60E-01	8.21E-01	No	ND	--	No	NA	No	No	NA
2-Methylnaphthalene	ug/kg	4	25%	1.04E+02	1.40E+02	No	ND	--	No	4.20E+05	No	No	<SGW
4,4'-DDE	ug/kg	4	75%	1.10E+01	2.00E+01	No	1.61E+01	Yes	No	2.70E+05	No	No	<SGW
4,4'-DDT	ug/kg	4	25%	8.95E+00	1.60E+01	No	1.41E+01	Yes	No	1.60E+05	No	No	<SGW
Acenaphthene	ug/kg	4	50%	4.81E+02	1.60E+03	No	ND	--	No	2.90E+06	No	No	<SGW
Aldrin	ug/kg	4	25%	3.83E+00	5.50E+00	No	ND	--	No	2.50E+03	No	No	<SGW
Aluminum	mg/kg	4	100%	5.75E+03	7.60E+03	No	2.54E+04	No	Yes	NA	No	No	<BK
Anthracene	ug/kg	4	75%	1.05E+03	3.60E+03	No	1.60E+02	Yes	No	5.90E+07	No	No	<SGW
Antimony	mg/kg	4	100%	3.28E+00	5.40E+00	No	3.80E+00	Yes	No	2.00E+01	No	No	<SGW
Arsenic	mg/kg	4	100%	3.33E+01	3.70E+01	No	1.91E+01	Yes	No	1.00E+02	No	No	<SGW
Barium	mg/kg	4	100%	1.71E+02	2.50E+02	No	3.63E+02	No	Yes	2.60E+02	No	No	<SGW
Benzo(a)anthracene	ug/kg	4	75%	2.56E+03	7.80E+03	No	2.40E+02	Yes	No	8.00E+03	No	No	<SGW
Benzo(a)pyrene	ug/kg	4	75%	2.30E+03	7.00E+03	No	1.87E+02	Yes	No	8.20E+04	No	No	<SGW
Benzo(b)fluoranthene	ug/kg	4	75%	2.19E+03	6.60E+03	No	1.79E+02	Yes	No	2.50E+04	No	No	<SGW
Benzo(g,h,i)perylene	ug/kg	4	75%	1.33E+03	3.80E+03	No	1.27E+02	Yes	No	2.10E+07	No	No	<SGW
Benzo(k)fluoranthene	ug/kg	4	75%	2.29E+03	6.80E+03	No	2.08E+02	Yes	No	2.50E+05	No	No	<SGW
Beryllium	mg/kg	4	100%	1.48E+00	1.60E+00	No	1.51E+00	Yes	No	1.40E+02	No	No	<SGW
beta-BHC	ug/kg	4	25%	1.66E+00	3.70E+00	No	ND	--	No	3.00E+00	Yes	Yes	>SGW
bis(2-Ethylhexyl)phthalate	ug/kg	4	50%	1.90E+02	3.10E+02	No	3.22E+02	No	Yes	3.10E+07	No	No	<SGW
Cadmium	mg/kg	4	100%	5.60E+00	1.00E+01	No	8.65E+00	Yes	No	1.00E+01	No	No	<SGW
Calcium	mg/kg	4	100%	2.00E+04	2.90E+04	Yes	3.35E+04	No	Yes	NA	No	No	EN
Carbazole	ug/kg	4	75%	4.80E+02	1.50E+03	No	6.40E+01	Yes	No	2.80E+03	No	No	<SGW
Chromium	mg/kg	4	100%	4.53E+01	7.90E+01	No	3.93E+01	Yes	No	NA	No	No	NA
Chrysene	ug/kg	4	75%	2.64E+03	7.80E+03	No	2.73E+02	Yes	No	8.00E+05	No	No	<SGW
Cobalt	mg/kg	4	100%	1.38E+01	1.70E+01	No	1.55E+01	Yes	No	NA	No	No	NA
Copper	mg/kg	4	100%	1.76E+03	4.70E+03	No	2.09E+02	Yes	No	3.30E+02	Yes	Yes	>SGW
Cyanide, Total	mg/kg	4	25%	6.05E-01	1.60E+00	No	ND	--	No	1.20E+02	No	No	<SGW
Dibenzo(a,h)anthracene	ug/kg	4	50%	4.55E+02	1.30E+03	No	ND	--	No	7.60E+03	No	No	<SGW
Dibenzofuran	ug/kg	4	25%	2.56E+02	7.50E+02	No	ND	--	No	NA	No	No	NA
Dieldrin	ug/kg	4	25%	7.83E+00	1.20E+01	No	ND	--	No	2.00E+01	No	No	<SGW
Endrin ketone	ug/kg	4	75%	1.23E+01	2.80E+01	No	ND	--	No	5.00E+03	No	No	<SGW
Fluoranthene	ug/kg	4	75%	5.77E+03	1.80E+04	No	5.02E+02	Yes	No	2.10E+07	No	No	<SGW
Fluorene	ug/kg	4	50%	4.21E+02	1.40E+03	No	ND	--	No	2.80E+06	No	No	<SGW
Gamma Chlordane	ug/kg	4	75%	1.15E+01	2.10E+01	No	ND	--	No	4.80E+04	No	No	<SGW
Heptachlor epoxide	ug/kg	4	75%	5.85E+00	9.20E+00	No	ND	--	No	3.30E+03	No	No	<SGW
Indeno(1,2,3-cd)pyrene	ug/kg	4	75%	1.58E+03	4.80E+03	No	ND	--	No	6.90E+04	No	No	<SGW
Iron	mg/kg	4	100%	2.30E+04	3.20E+04	Yes	3.80E+04	No	Yes	NA	No	No	EN
Lead	mg/kg	4	100%	3.69E+02	9.40E+02	No	1.85E+02	Yes	No	NA	No	No	NA
Magnesium	mg/kg	4	100%	2.49E+03	4.20E+03	Yes	1.72E+04	No	Yes	NA	No	No	EN

Fill Area - Soil-to-Groundwater TACO Screen
Area L

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Manganese	mg/kg	4	100%	3.51E+02	6.50E+02	No	8.83E+02	No	Yes	NA	No	No	<BK
Mercury	mg/kg	4	100%	3.22E-01	5.60E-01	No	1.77E-01	Yes	No	5.00E-02	Yes	Yes	>SGW
Methoxychlor	ug/kg	4	50%	2.63E+01	4.60E+01	No	ND	--	No	7.80E+05	No	No	<SGW
Molybdenum	mg/kg	4	100%	1.45E+01	2.30E+01	No	2.02E+00	Yes	No	NA	No	No	NA
Naphthalene	ug/kg	4	25%	1.49E+02	3.20E+02	No	ND	--	No	4.20E+05	No	No	<SGW
Nickel	mg/kg	4	100%	4.68E+01	5.50E+01	No	4.27E+01	Yes	No	4.00E+02	No	No	<SGW
Pentachlorophenol	ug/kg	4	25%	2.38E+02	2.40E+02	No	See notes	--	No	1.00E+02	Yes	Yes	>SGW
Phenanthrene	ug/kg	4	75%	3.62E+03	1.20E+04	No	3.35E+02	Yes	No	5.90E+07	No	No	<SGW
Potassium	mg/kg	4	100%	1.09E+03	1.70E+03	Yes	4.73E+03	No	Yes	NA	No	No	EN
Pyrene	ug/kg	4	75%	4.27E+03	1.30E+04	No	4.35E+02	Yes	No	2.10E+07	No	No	<SGW
Selenium	mg/kg	4	100%	3.08E+00	4.30E+00	No	ND	--	No	2.40E+00	Yes	Yes	>SGW
Silver	mg/kg	4	75%	8.13E-01	1.20E+00	No	1.35E+00	No	Yes	NA	No	No	<BK
Sodium	mg/kg	4	100%	3.45E+02	5.40E+02	Yes	5.77E+02	No	Yes	NA	No	No	EN
Thallium	mg/kg	4	100%	1.85E+00	2.10E+00	No	ND	--	No	1.60E+01	No	No	<SGW
Toluene	ug/kg	4	25%	6.08E+00	1.30E+01	No	ND	--	No	2.90E+04	No	No	<SGW
Total PCBs	ug/kg	4	50%	4.90E+02	1.17E+03	No	See notes	--	No	NA	No	No	NA
Vanadium	mg/kg	4	100%	4.43E+01	4.90E+01	No	6.90E+01	No	Yes	NA	No	No	<BK
Zinc	mg/kg	4	100%	5.10E+02	8.70E+02	No	8.08E+02	Yes	No	2.00E+03	No	No	<SGW

Fill Area - Soil-to-Groundwater TACO Screen
Area N

Constituent	Units	Number of Samples Analyzed	Frequency of Detection	Average (Avg)	Maximum Detected Concentration (Max)	Essential Nutrient (EN)?	Surface Soil Background (BK) Concentration	Is Max>BK?	Pass EN/BK?	Taco Tier I Soil-to-groundwater (SGW) Concentration	Is Max>SGW?	COPC?	Reason
Total 2,3,7,8-TCDD TEQ	ug/kg	4	100%	9.76E-02	3.45E-01	No	ND	--	No	NA	No	No	NA
4,4'-DDT	ug/kg	4	25%	2.02E+00	2.70E+00	No	1.41E+01	No	Yes	1.60E+05	No	No	<SGW
Aldrin	ug/kg	4	25%	1.03E+00	1.28E+00	No	ND	--	No	2.50E+03	No	No	<SGW
Alpha Chlordane	ug/kg	4	25%	9.67E-01	1.10E+00	No	ND	--	No	4.80E+04	No	No	<SGW
Aluminum	mg/kg	4	100%	8.75E+03	1.10E+04	No	2.54E+04	No	Yes	NA	No	No	<BK
Anthracene	ug/kg	4	75%	4.70E+01	5.80E+01	No	1.60E+02	No	Yes	5.90E+07	No	No	<SGW
Antimony	mg/kg	4	25%	7.10E-01	7.10E-01	No	3.80E+00	No	Yes	2.00E+01	No	No	<SGW
Arsenic	mg/kg	4	100%	6.33E+00	7.30E+00	No	1.91E+01	No	Yes	1.00E+02	No	No	<SGW
Barium	mg/kg	4	100%	5.93E+02	1.20E+03	No	3.63E+02	Yes	No	2.60E+02	Yes	Yes	>SGW
Benzo(a)anthracene	ug/kg	4	100%	1.68E+02	2.70E+02	No	2.40E+02	Yes	No	8.00E+03	No	No	<SGW
Benzo(a)pyrene	ug/kg	4	100%	1.87E+02	3.30E+02	No	1.87E+02	Yes	No	8.20E+04	No	No	<SGW
Benzo(b)fluoranthene	ug/kg	4	100%	1.65E+02	3.20E+02	No	1.79E+02	Yes	No	2.50E+04	No	No	<SGW
Benzo(g,h,i)perylene	ug/kg	4	25%	1.44E+02	3.00E+02	No	1.27E+02	Yes	No	2.10E+07	No	No	<SGW
Benzo(k)fluoranthene	ug/kg	4	100%	2.18E+02	3.60E+02	No	2.08E+02	Yes	No	2.50E+05	No	No	<SGW
beta-BHC	ug/kg	4	25%	2.93E-01	3.38E-01	No	ND	--	No	3.00E+00	No	No	<SGW
bis(2-Ethylhexyl)phthalate	ug/kg	4	25%	1.01E+02	1.30E+02	No	3.22E+02	No	Yes	3.10E+07	No	No	<SGW
Cadmium	mg/kg	4	100%	8.46E-01	1.50E+00	No	8.65E+00	No	Yes	1.00E+01	No	No	<SGW
Calcium	mg/kg	4	100%	5.73E+04	1.09E+05	Yes	3.35E+04	Yes	Yes	NA	No	No	EN
Chromium	mg/kg	4	100%	1.65E+01	1.80E+01	No	3.93E+01	No	Yes	NA	No	No	<BK
Chrysene	ug/kg	4	100%	2.00E+02	3.10E+02	No	2.73E+02	Yes	No	8.00E+05	No	No	<SGW
Cobalt	mg/kg	4	100%	5.84E+00	6.15E+00	No	1.55E+01	No	Yes	NA	No	No	<BK
Copper	mg/kg	4	100%	5.01E+01	1.10E+02	No	2.09E+02	No	Yes	3.30E+02	No	No	<SGW
Dibenzo(a,h)anthracene	ug/kg	4	50%	7.25E+01	1.10E+02	No	ND	--	No	7.60E+03	No	No	<SGW
Dieldrin	ug/kg	4	25%	1.89E+00	2.13E+00	No	ND	--	No	2.00E+01	No	No	<SGW
Fluoranthene	ug/kg	4	100%	3.93E+02	6.10E+02	No	5.02E+02	Yes	No	2.10E+07	No	No	<SGW
Gamma Chlordane	ug/kg	4	25%	1.38E+00	1.85E+00	No	ND	--	No	4.80E+04	No	No	<SGW
Indeno(1,2,3-cd)pyrene	ug/kg	4	75%	1.44E+02	2.50E+02	No	ND	--	No	6.90E+04	No	No	<SGW
Iron	mg/kg	4	100%	1.43E+04	1.50E+04	Yes	3.80E+04	No	Yes	NA	No	No	EN
Lead	mg/kg	4	100%	1.38E+02	4.10E+02	No	1.85E+02	Yes	No	NA	No	No	NA
Magnesium	mg/kg	4	100%	7.18E+03	1.15E+04	Yes	1.72E+04	No	Yes	NA	No	No	EN
Manganese	mg/kg	4	100%	3.74E+02	4.10E+02	No	8.83E+02	No	Yes	NA	No	No	<BK
Mercury	mg/kg	4	100%	6.78E-02	9.50E-02	No	1.77E-01	No	Yes	5.00E-02	Yes	No	<BK
Methoxychlor	ug/kg	4	25%	2.06E+01	5.50E+01	No	ND	--	No	7.80E+05	No	No	<SGW
Molybdenum	mg/kg	4	100%	1.03E+00	1.45E+00	No	2.02E+00	No	Yes	NA	No	No	<BK
Nickel	mg/kg	4	100%	1.61E+01	1.70E+01	No	4.27E+01	No	Yes	4.00E+02	No	No	<SGW
Pentachlorophenol	ug/kg	4	100%	3.07E+02	4.74E+02	No	See notes	--	No	1.00E+02	Yes	Yes	>SGW
Phenanthrene	ug/kg	4	100%	1.76E+02	2.60E+02	No	3.35E+02	No	Yes	5.90E+07	No	No	<SGW
Potassium	mg/kg	4	100%	1.40E+03	1.60E+03	Yes	4.73E+03	No	Yes	NA	No	No	EN
Pyrene	ug/kg	4	100%	3.41E+02	5.50E+02	No	4.35E+02	Yes	No	2.10E+07	No	No	<SGW
Selenium	mg/kg	4	25%	5.69E-01	6.80E-01	No	ND	--	No	2.40E+00	No	No	<SGW
Total PCBs	ug/kg	4	25%	5.13E+01	1.78E+02	No	See notes	--	No	NA	No	No	NA
Vanadium	mg/kg	4	100%	2.38E+01	2.90E+01	No	6.90E+01	No	Yes	NA	No	No	<BK
Zinc	mg/kg	4	100%	1.49E+02	2.50E+02	No	8.08E+02	No	Yes	2.00E+03	No	No	<SGW

Table G-2
Soil to-Groundwater Screen -pH Evaluation
Fill Areas
Sauget Area 1 - EE/CA and RI/FA
Human Health Risk Assessment

	Fill Area H pH = 7-7.6			Fill Area I pH = 7.7-8.4			Fill Area L pH = 7.5-7.9			Fill Area N pH = 7.8-7.9		
Constituent	**Conc. (a)**	**SGW (pH) (b)**	**COPC? (c)**	**Conc. (a)**	**SGW (pH) (b)**	**COPC? (c)**	**Conc. (a)**	**SGW (pH) (b)**	**COPC? (c)**	**Conc. (a)**	**SGW (pH) (b)**	**COPC? (c)**
4-Chloroaniline	--	NA	--	1.80E+01	NA	Yes	--	NA	--	--	NA	--
Barium	--	1.70E+03	--	7.40E+02	1.80E+03	No	--	1.80E+03	--	1.20E+03	2.10E+03	No
Beta-BHC	--	NA	--	--	NA	--	3.70E-03	NA	Yes	--	NA	--
Cadmium	2.20E+01	1.10E+02	No	3.10E+01	5.90E+02	No	--	5.90E+02	--	--	4.30E+03	--
Copper	4.80E+02	2.00E+05	No	1.30E+04	3.30E+05	No	4.70E+03	3.30E+05	No	--	3.30E+05	--
Dieldrin	--	NA	--	2.00E-01	NA	Yes	--	NA	--	--	NA	--
Mercury	7.70E-01	1.60E+01	No	2.00E+00	3.20E+01	No	5.60E-01	3.20E+01	No	--	4.00E+01	--
Pentachlorophenol	2.41E-01	1.10E-01	Yes	1.65E+00	1.00E-01	Yes	2.40E-01	1.00E-01	Yes	4.70E-01	1.00E-01	Yes
Selenium	4.70E+00	3.30E+00	Yes	--	2.40E+00	--	4.30E+00	2.40E+00	Yes	--	2.40E+00	--
Zinc	3.60E+03	1.50E+04	No	2.80E+03	3.20E+04	No	--	3.20E+04	--	--	1.10E+05	--

Notes:
-- Not a constituent of potential concern in this area/medium.
Conc. - Concentration.
COPC - Constituent of Potential Concern.
NA - Not available.
SGW (pH) - pH- specific Soil-to-Groundwater TACO Tier 1 Value.
(a) - Maximum detected concentration in this area/medium (includes all constituents identified as potential COPC after the SGW screen).
(b) - TACO Tier I Appendix B Table D values - pH specific Soil Remediation Objectives for Inorganics and Ionizable Organics for the Soil Component of the Groundwater Ingestion Route (Class II Groundwater). Where pH range overlaps table ranges, the lower table value is used.
(c) - Constituent is identified as a COPC if Conc. >SGW (pH) or if no SGW (pH) value available.

Table G-3
Soil to Groundwater Screen pH Evaluation
Transects Surface Soil
Sauget Area 1 EE/CA and HHRA
Human Health Risk Assessment

Constituent	Transect 1 pH = 7.0-8.2			Transect 2 pH = 6.3-7.7			Transect 3 pH = 4.9-7.8			Transect 4 pH = 6.9-8.5			Transect 5 pH = 6.7-8.1			Transect 6 pH = 7.7-8.0			Transect 7 pH = 7.4-8.1		
	Conc. (a)	SGW (pH) (b)	COPC? (c)	Conc. (a)	SGW (pH) (b)	COPC? (c)	Conc. (a)	SGW (pH) (b)	COPC? (c)	Conc. (a)	SGW (pH) (b)	COPC? (c)	Conc. (a)	SGW (pH) (b)	COPC? (c)	Conc. (a)	SGW (pH) (b)	COPC? (c)	Conc. (a)	SGW (pH) (b)	COPC? (c)
Barium	--	1 70E+03	--	--	1 50E+03	--	--	4 00E+02	--	1 20E+03	1.70E+03	No	--	1 60E+03	--	--	1 80E+03	--	--	1 80E+03	--
Benzo(a)anthracene	--	NA	--	--	NA	--		NA	--	--	NA	--	--	NA	--	--	NA	--	--	NA	--
Beta BHC	--	NA	--	--	NA	--	--	NA		--	NA	--	--	NA	--	3 80E-03	NA	Yes	--	NA	--
Dieldrin	--	NA	--		NA	--	--	NA	--	--	NA	--	1 20E 01	NA	Yes	--	NA	--	--	NA	--
Mercury	--	1 60E+01	--	--	4 40E+00	--	--	6 00E-02	--	5 70E-01	1 60E+01	No	--	1 00E+01	--	--	3 20E+01	--		3 20E+01	--
Pentachlorophenol	4 80E-01	1 00E-01	Yes	2 50E 01	1 10E-01	Yes	7 40E-01	1 00E-01	Yes	5 00E-01	1 00E-01	Yes	2 40E-01	1 00E-01	Yes	2 50E-01	1 00E-01	Yes	2 50E-01	1 00E-01	Yes
Selenium	--	2 40E+00	--	--	3 30E+00	--	3 20E+00	2 40E+00	Yes	--	2 40E+00	--	--	2 40E+00	--	--	2 40E+00	--	--	2 40E+00	--

Notes
-- Not a constituent of potential concern in this area/medium
Conc - Concentration
COPC - Constituent of Potential Concern
NA - Not available
SGW (pH) - pH- specific Soil-to Groundwater TACO Tier 1 Value
(a) - Maximum detected concentration in this area/medium (includes all constituents identified as potential COPC after the SGW screen).
(b) - TACO Tier I Appendix B Table D values - pH specific Soil Remediation Objectives for Inorganics and Ionizable Organics for the Soil Component of the Groundwater Ingestion Route (Class II Groundwater) Where pH range overlaps table ranges, the lower table value is used
(c) - Constituent is Identified as a COPC if Conc >SGW (pH) or if no SGW (pH) value available

G-37

Table G-4
Soil to Groundwater Screen pH Evaluation
Transects - Subsurface Soil
Sauget Area 1 - EE/CA and RI/FA
Human Health Risk Assessment

Constituent	Transect 1 pH = 7.5-8.3			Transect 3 pH = 7.6-8.0			Transect 4 pH = 7.75-8.5		
	Conc. (a)	SGW (pH) (b)	COPC? (c)	Conc. (a)	SGW (pH) (b)	COPC? (c)	Conc. (a)	SGW (pH) (b)	COPC? (c)
Barium	--	1.80E+03	--	--	1.80E+03	--	--	2 10E+03	--
Benzo(a)anthracene	--	NA	--	--	NA	--	1 20E+01	NA	Yes
Beta-BHC	--	NA	--	--	NA	--	--	NA	--
Dieldrin	--	NA	--	--	NA	--	--	NA	--
Mercury	7 00E-02	3 20E+01	No	7 80E-02	3 20E+01	No	--	4 00E+01	--
Pentachlorophenol	--	1 00E-01	--	2 80E-01	1 00E-01	Yes	5 50E-01	1 00E-01	Yes
Selenium	--	2 40E+00	--	--	2.40E+00	--	--	2.40E+00	--

Constituent	Transect 5 pH = 7.9-8.3			Transect 6 pH = 8.0-9.0			Transect 7 pH = 7.6-8.4		
	Conc. (a)	SGW (pH) (b)	COPC? (c)	Conc. (a)	SGW (pH) (b)	COPC? (c)	Conc. (a)	SGW (pH) (b)	COPC? (c)
Barium	--	2 10E+03	--	--	2 10E+03	--	--	1 80E+03	--
Benzo(a)anthracene	--	NA	--	--	NA	--	--	NA	--
Beta-BHC	--	NA	--	--	NA	--	--	NA	--
Dieldrin	--	NA	--	--	NA	--	--	NA	--
Mercury	8 60E-02	4.00E+01	No	1.90E-01	4 00E+01	No	2 90E-01	3 20E+01	No
Pentachlorophenol	--	1 00E-01	--	2 50E-01	1 00E-01	Yes	3 00E-01	1 00E-01	Yes
Selenium	--	2.40E+00	--	--	2 40E+00	--	--	2.40E+00	--

Notes:
-- Not a constituent of potential concern in this area/medium
Conc - Concentration
COPC - Constituent of Potential Concern
NA - Not available
SGW (pH) - pH- specific Soil-to-Groundwater TACO Tier 1 Value.
(a) - Maximum detected concentration in this area/medium (includes all constituents identified as potential COPC after the SGW screen).
(b) - TACO Tier I Appendix B Table D values - pH specific Soil Remediation Objectives for Inorganics and Ionizable Organics for the Soil Component of the Groundwater Ingestion Route (Class II Groundwater). Where pH range overlaps table ranges, the lower table value is used.
(c) - Constituent is identified as a COPC if Conc. >SGW (pH) or if no SGW (pH) value available.

APPENDIX H

COPC SELECTION FOR GROUNDWATER

APPENDIX H
COPC SELECTION FOR GROUNDWATER

This appendix presents the screening tables for identifying COPCs for groundwater. COPCs are identified on a well-by-well basis using the "Groundwater and Surface Water Standards" presented in Appendix C Table C-4. The screening tables present:

- The frequency of detection and the arithmetic mean and maximum detected concentrations;
- An identification of essential nutrient status and comparison to background, as presented in Appendix D;
- Comparison to the TACO Tier 1 groundwater screening values; and
- An identification of whether or not a constituent is selected as a COPC and the reason why or why not.

The information in the last column of each table pertains to the short-term risk assessment, and will be discussed in Section 7.0 of the text.

The screening tables are presented in the following order (well screening interval or sample identification, which includes a sample depth designator, is provided where more than one sample was included in the analysis):

<u>Fill Area G</u>

AA-GHL-S1	(AA-GHL-S1-12-16FT, AA-GHL-S1-22-26FT)
AA-GHL-S2	(AA-GHL-S2-12-16FT, AA-GHL-S2-22-26FT)
AA-GHL-S3	(AA-GHL-S3-20-24FT)
AA-SW-S1	(AA-SW-S1-14-16FT. AA-SW-S1-24-26FT)
EEG-101	(18-23FT)
EEG-102	(16.5-21.5FT)
EEG-104	(19-24FT)
EEG-106	(18-23 FT)
EEG-107	(23-28 FT)
EEG-112	(12-26FT)
EE-05	(18-23 FT)

<u>Fill Area H</u>

EEG-110	(18-23FT)
EE-01	(28-33 FT)
EE-02	(18-23 FT)
EE-03	(27-32 FT)

Fill Area I

AA-I-S1	(AA-I-S1-17-21FT, AA-I-S1-27-31FT)
AA-I-S2	(AA-I-S2-16-20FT, AA-I-S2-26-30FT)
AA-I-S3	(AA-I-S3-24-28FT)
EE-12	(28-33 FT)
EE-13	(23-29 FT)
EE-14	(32.5-37.5 FT)
EE-15	(24-29 FT)

Fill Area L

EEG-103	(16.5-21.5FT)
EEG-105	(no construction log)
EEG-109	(17-22 FT)
EEG-111	(no construction log)
AA-SW-S2	(AA-SW-S2-14-16FT, AA-SW-S2-22-26FT)
AA-SW-S3	(AA-SW-S3-14-16FT, AA-SW-S3-22-26FT)

Residential Area Wells

SGW-S1	(SGW-S1-15FT, SGW-S1-20FT)
SGW-S2	(SGW-S2-15FT, SGW-S2-20FT)
DW-MCDO	Unknown
DW-SCHM	Unknown
DW-SETT	Unknown
DW-WRIG	Unknown

The screening results are summarized in Section 3.3.2 of the text.

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: G
Well. AA-GHL-S1

	Summary Statistics				COPC Selection - Chronic Exposure Screen									Short-Term Exposure Screen	
Constituent	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
1,2,4-Trichlorobenzene	1	1	1.30E+00	1 30E+00	No	ND	--	No	7.00E+02	No	No	<Tier 1	7.00E+04	No
1,2-Dichlorobenzene	1	1	1 20E+00	1 20E+00	No	ND	--	No	1.50E+03	No	No	<Tier 1	1.50E+05	No
Aluminum	2	1	1.38E+02	1.95E+02	No	ND	--	No	3.60E+04	No	No	<Tier 1	3 60E+06	No
Barium	2	2	1.18E+02	1.35E+02	No	6 17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Calcium	2	2	1.33E+05	1.40E+05	Yes	4 27E+05	No	Yes	NA	--	No	EN	NA	--
Chlorobenzene	1	1	9.40E-01	9.40E-01	No	ND	--	No	5.00E+02	No	No	<Tier 1	5.00E+04	No
Chromium	1	1	3.60E+00	3.60E+00	No	1.05E+02	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Cis/Trans-1,2-Dichloroethene	1	1	7.10E-01	7.10E-01	No	ND	--	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Cobalt	1	1	3.50E+00	3.50E+00	No	1.14E+01	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Copper	1	1	2.30E+00	2.30E+00	No	ND	--	No	6.50E+02	No	No	<Tier 1	6 50E+04	No
delta-BHC	2	1	1.90E-02	3.20E-02	No	1.25E-02	Yes	No	1.50E-01	No	No	<Tier 1	1.50E+01	No
gamma-BHC (Lindane)	2	1	1.98E-02	3.00E-02	No	1.01E-02	Yes	No	1.00E+00	No	No	<Tier 1	1.00E+02	No
Iron	2	2	7.60E+02	7.70E+02	Yes	2.20E+04	No	Yes	5.00E+03	No	No	EN	5.00E+05	No
Magnesium	2	2	2.75E+04	3.00E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	2	2	3 86E+02	7.30E+02	No	1 75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Molybdenum	2	1	1.05E+01	1.60E+01	No	ND	--	No	1.80E+02	No	No	<Tier 1	1.80E+04	No
Nickel	2	2	1 03E+01	1.15E+01	No	1.30E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Pentachlorophenol	1	1	2.95E-01	2.95E-01	No	ND	--	No	5.00E+00	No	No	<Tier 1	5.00E+02	No
Potassium	2	2	4.73E+03	6.25E+03	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	2	2	1.33E+04	1.55E+04	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Tetrachloroethene	2	2	1.02E+01	1.30E+01	No	ND	--	No	2.50E+01	No	No	<Tier 1	2.50E+03	No
Toluene	1	1	6.85E-01	6.85E-01	No	ND	--	No	2.50E+03	No	No	<Tier 1	2.50E+05	No
Total PCBs	2	1	1.09E+00	1.18E+00	No	ND	--	No	2.50E+00	No	No	<Tier 1	2.50E+02	No
Total TCDD-TEQ	1	1	3.93E-06	3.93E-06	No	5.02E-07	Yes	No	3 00E-05	No	No	<Tier 1	3.00E-03	No
Trichloroethene	2	2	1 20E+00	1.90E+00	No	ND	--	No	2.50E+01	No	No	<Tier 1	2.50E+03	No

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: G
Well AA-GHL-S2

Constituent	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
Aluminum	2	1	8.50E+02	1.60E+03	No	ND	--	No	3.60E+04	No	No	<Tier 1	3.60E+06	No
Arsenic	1	1	3.80E+00	3.80E+00	No	1.17E+01	No	Yes	2.00E+02	No	No	<Tier 1	2.00E+04	No
Barium	2	2	1.24E+02	1.60E+02	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Calcium	2	2	1.25E+05	1.40E+05	Yes	4.27E+05	No	Yes	NA	--	No	EN	NA	--
Cis/Trans-1,2-Dichloroethene	2	2	1.23E+00	1.90E+00	No	ND	--	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Cobalt	2	2	3.60E+00	4.20E+00	No	1.14E+01	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Iron	2	2	1.49E+03	2.70E+03	Yes	2.20E+04	No	Yes	5.00E+03	No	No	EN	5.00E+05	No
Magnesium	2	2	2.70E+04	3.20E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	2	2	7.10E+02	1.20E+03	No	1.75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Molybdenum	2	2	4.50E+00	4.50E+00	No	ND	--	No	1.80E+02	No	No	<Tier 1	1.80E+04	No
Nickel	2	2	9.50E+00	9.80E+00	No	1.30E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Potassium	2	2	4.00E+03	5.00E+03	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	2	2	7.75E+03	8.20E+03	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Trichloroethene	2	2	1.20E+00	1.60E+00	No	ND	--	No	2.50E+01	No	No	<Tier 1	2.50E+03	No
Vanadium	1	1	4.00E+00	4.00E+00	No	ND	--	No	4.90E+01	No	No	<Tier 1	4.90E+03	No
Zinc	1	1	9.10E+00	9.10E+00	No	ND	--	No	1.00E+04	No	No	<Tier 1	1.00E+06	No

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: G
Well: AA-GHL-S3

Constituent	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
Barium	1	1	1.30E+02	1.30E+02	No	6 17E+02	No	Yes	2 00E+03	No	No	<Tier 1	2.00E+05	No
bis(2-Ethylhexyl)phthalate	1	1	8.00E-01	8.00E-01	No	ND	--	No	6.00E+01	No	No	<Tier 1	6.00E+03	No
Calcium	1	1	1.70E+05	1.70E+05	Yes	4 27E+05	No	Yes	NA	--	No	EN	NA	--
Cobalt	1	1	5.80E+00	5.80E+00	No	1.14E+01	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Iron	1	1	2.00E+02	2.00E+02	Yes	2 20E+04	No	Yes	5.00E+03	No	No	EN	5.00E+05	No
Magnesium	1	1	3.70E+04	3.70E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	1	1	1 50E+03	1.50E+03	No	1.75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Nickel	1	1	1.20E+01	1.20E+01	No	1.30E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Potassium	1	1	1 20E+04	1.20E+04	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	1	1	1.90E+04	1.90E+04	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Total PCBs	1	1	1.23E+00	1 23E+00	No	ND	--	No	2.50E+00	No	No	<Tier 1	2.50E+02	No

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: G
Well: AA-SW-S1

Constituent	Summary Statistics: Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	COPC Selection - Chronic Exposure Screen: Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	Short-Term Exposure Screen: 100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
Acetone	2	1	2.65E+01	2.60E+01	No	ND	--	No	7.00E+02	No	No	<Tier 1	7.00E+04	No
Aluminum	2	1	2.45E+03	4.60E+03	No	ND	--	No	3.60E+04	No	No	<Tier 1	3.60E+06	No
Arsenic	1	1	4.50E+00	4.50E+00	No	1.17E+01	No	Yes	2.00E+02	No	No	<Tier 1	2.00E+04	No
Barium	2	2	2.40E+02	3.10E+02	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Calcium	2	2	1.35E+05	1.40E+05	Yes	4.27E+05	No	Yes	NA	--	No	EN	NA	--
Cobalt	2	1	7.35E+00	9.70E+00	No	1.14E+01	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Copper	2	2	2.65E+00	4.30E+00	No	ND	--	No	6.50E+02	No	No	<Tier 1	6.50E+04	No
Iron	2	2	4.91E+03	9.10E+03	Yes	2.20E+04	No	Yes	5.00E+03	Yes	No	EN	5.00E+05	No
Lead	2	1	5.10E+00	7.70E+00	No	ND	--	No	1.00E+02	No	No	<Tier 1	1.00E+04	No
Magnesium	2	2	3.60E+04	3.90E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	2	2	7.00E+02	7.80E+02	No	1.75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Molybdenum	2	1	5.10E+00	5.20E+00	No	ND	--	No	1.80E+02	No	No	<Tier 1	1.80E+04	No
Nickel	2	2	1.75E+01	2.30E+01	No	1.30E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Phenanthrene	1	1	4.20E-01	4.20E-01	No	ND	--	No	1.05E+04	No	No	<Tier 1	1.05E+06	No
Potassium	2	2	5.75E+03	6.20E+03	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	2	2	1.10E+04	1.20E+04	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Vanadium	2	1	9.00E+00	1.30E+01	No	ND	--	No	4.90E+01	No	No	<Tier 1	4.90E+03	No
Zinc	2	1	2.30E+01	3.60E+01	No	ND	--	No	1.00E+04	No	No	<Tier 1	1.00E+06	No

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: G
Well EEG-101

Constituent	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
2,4,5-TP (Silvex)	1	1	1.40E-01	1.40E-01	No	3.20E-01	No	Yes	2.50E+02	No	No	<Tier 1	2.50E+04	No
4,4'-DDE	1	1	4.00E-03	4.00E-03	No	ND	--	No	2.00E-01	No	No	<Tier 1	2.00E+01	No
Aluminum	1	1	5.80E+02	5.80E+02	No	ND	--	No	3.60E+04	No	No	<Tier 1	3.60E+06	No
Arsenic	1	1	2.10E+01	2.10E+01	No	1.17E+01	Yes	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Barium	1	1	1.30E+02	1.30E+02	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Calcium	1	1	1.20E+05	1.20E+05	Yes	4.27E+05	No	Yes	NA	--	No	EN	NA	--
Chromium	1	1	5.30E+00	5.30E+00	No	1.05E+02	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Cobalt	1	1	4.40E+00	4.40E+00	No	1.14E+01	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Copper	1	1	1.50E+00	1.50E+00	No	ND	--	No	6.50E+02	No	No	<Tier 1	6.50E+04	No
delta-BHC	1	1	8.20E-03	8.20E-03	No	1.25E-02	No	Yes	1.50E-01	No	No	<Tier 1	1.50E+01	No
Endosulfan I	1	1	1.60E-03	1.60E-03	No	ND	--	No	2.10E+02	No	No	<Tier 1	2.10E+04	No
Endrin aldehyde	1	1	3.80E-03	3.80E-03	No	ND	--	No	1.00E+01	No	No	<Tier 1	1.00E+03	No
Heptachlor	1	1	1.20E-03	1.20E-03	No	2.60E-02	No	Yes	2.00E+00	No	No	<Tier 1	2.00E+02	No
Iron	1	1	6.40E+03	6.40E+03	Yes	2.20E+04	No	Yes	5.00E+03	Yes	No	EN	5.00E+05	No
Magnesium	1	1	2.50E+04	2.50E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	1	1	2.40E+03	2.40E+03	No	1.75E+03	Yes	No	1.00E+04	No	No	<Tier 1	1.00E+06	No
Molybdenum	1	1	5.20E+00	5.20E+00	No	ND	--	No	1.80E+02	No	No	<Tier 1	1.80E+04	No
Nickel	1	1	2.00E+01	2.00E+01	No	1.30E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Potassium	1	1	4.00E+03	4.00E+03	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	1	1	1.60E+04	1.60E+04	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Total TCDD-TEQ	1	1	6.46E-06	6.46E-06	No	5.02E-07	Yes	No	3.00E-05	No	No	<Tier 1	3.00E-03	No

H-9

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: G
Well: EEG-102

	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
Constituent	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
1,2,4-Trichlorobenzene	1	1	1.00E+01	1.00E+01	No	ND	--	No	7.00E+02	No	No	<Tier 1	7.00E+04	No
1,4-Dichlorobenzene	1	1	5.80E+01	5.80E+01	No	ND	--	No	3.75E+02	No	No	<Tier 1	3.75E+04	No
alpha-BHC	1	1	1.07E-05	1.07E-05	No	ND	--	No	1.50E-01	No	No	<Tier 1	1.50E+01	No
Arsenic	1	1	2.80E+01	2.80E+01	No	1.17E+01	Yes	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Barium	1	1	9.50E+01	9.50E+01	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Calcium	1	1	8.40E+04	8.40E+04	Yes	4.27E+05	No	Yes	NA	--	No	EN	NA	--
Chlorobenzene	1	1	1.10E+01	1.10E+01	No	ND	--	No	5.00E+02	No	No	<Tier 1	5.00E+04	No
Cobalt	1	1	5.00E+00	5.00E+00	No	1.14E+01	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Iron	1	1	6.50E+03	6.50E+03	Yes	2.20E+04	No	Yes	5.00E+03	Yes	No	EN	5.00E+05	No
Magnesium	1	1	1.80E+04	1.80E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	1	1	6.30E+02	6.30E+02	No	1.75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Molybdenum	1	1	9.50E+00	9.50E+00	No	ND	--	No	1.80E+02	No	No	<Tier 1	1.80E+04	No
Nickel	1	1	1.70E+01	1.70E+01	No	1.30E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Potassium	1	1	6.70E+03	6.70E+03	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	1	1	1.60E+04	1.60E+04	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Total TCDD-TEQ	1	1	1.07E-05	1.07E-05	No	5.02E-07	Yes	No	3.00E-05	No	No	<Tier 1	3.00E-03	No
Zinc	1	1	1.90E+01	1.90E+01	No	ND	--	No	1.00E+04	No	No	<Tier 1	1.00E+06	No

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: G
Well. EEG-104

	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
Constituent	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
4,4'-DDE	1	1	3.90E-03	3.90E-03	No	ND	--	No	2.00E-01	No	No	<Tier 1	2.00E+01	No
alpha-BHC	1	1	8.00E-04	8.00E-04	No	ND	--	No	1.50E-01	No	No	<Tier 1	1.50E+01	No
Aluminum	1	1	3.10E+01	3.10E+01	No	ND	--	No	3.60E+04	No	No	<Tier 1	3.60E+06	No
Barium	1	1	1.60E+02	1.60E+02	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Calcium	1	1	1.50E+05	1.50E+05	Yes	4.27E+05	No	Yes	NA	--	No	EN	NA	--
Cobalt	1	1	2.50E+00	2.50E+00	No	1.14E+01	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Dieldrin	1	1	2.60E-03	2.60E-03	No	ND	--	No	1.00E-01	No	No	<Tier 1	1.00E+01	No
Endosulfan II	1	1	6.90E-03	6.90E-03	No	ND	--	No	2.10E+02	No	No	<Tier 1	2.10E+04	No
Endrin aldehyde	1	1	1.10E-02	1.10E-02	No	ND	--	No	1.00E+01	No	No	<Tier 1	1.00E+03	No
Endrin ketone	1	1	9.30E-03	9.30E-03	No	5.21E-02	No	Yes	1.00E+01	No	No	<Tier 1	1.00E+03	No
gamma-BHC (Lindane)	1	1	9.00E-04	9.00E-04	No	1.01E-02	No	Yes	1.00E+00	No	No	<Tier 1	1.00E+02	No
Iron	1	1	1.00E+02	1.00E+02	Yes	2.20E+04	No	Yes	5.00E+03	No	No	EN	5.00E+05	No
Magnesium	1	1	3.80E+04	3.80E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	1	1	7.20E+02	7.20E+02	No	1.75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Nickel	1	1	1.50E+01	1.50E+01	No	1.30E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Potassium	1	1	4.50E+03	4.50E+03	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	1	1	1.20E+04	1.20E+04	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Total TCDD-TEQ	1	1	2.40E-05	2.40E-05	No	5.02E-07	Yes	No	3.00E-05	No	No	<Tier 1	3.00E-03	No
Zinc	1	1	1.10E+01	1.10E+01	No	ND	--	No	1.00E+04	No	No	<Tier 1	1.00E+06	No

H-11

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: G
Well: EEG-106

	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
Constituent	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
1,2,4-Trichlorobenzene	1	1	4.70E+01	4.70E+01	No	ND	--	No	7.00E+02	No	No	<Tier 1	7.00E+04	No
1,2-Dichlorobenzene	1	1	4.60E+00	4.60E+00	No	ND	--	No	1.50E+03	No	No	<Tier 1	1.50E+05	No
1,4-Dichlorobenzene	1	1	3.30E+02	3.30E+02	No	ND	--	No	3.75E+02	No	No	<Tier 1	3.75E+04	No
2,4,6-Trichlorophenol	1	1	4.70E-01	4.70E-01	No	ND	--	No	3.20E+01	No	No	<Tier 1	3.20E+03	No
2,4-Dichlorophenol	1	1	1.10E+01	1.10E+01	No	ND	--	No	2.10E+01	No	No	<Tier 1	2.10E+03	No
2-Chlorophenol	1	1	2.30E+00	2.30E+00	No	ND	--	No	1.75E+02	No	No	<Tier 1	1.75E+04	No
alpha-BHC	1	1	8.30E+00	8.30E+00	No	ND	--	No	1.50E-01	Yes	Yes	>Tier 1	1.50E+01	No
Arsenic	1	1	4.20E+01	4.20E+01	No	1.17E+01	Yes	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Barium	1	1	1.30E+02	1.30E+02	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Benzene	1	1	9.30E+00	9.30E+00	No	ND	--	No	2.50E+01	No	No	<Tier 1	2.50E+03	No
beta-BHC	1	1	3.60E-01	3.60E-01	No	ND	--	No	1.50E-01	Yes	Yes	>Tier 1	1.50E+01	No
Calcium	1	1	2.80E+05	2.80E+05	Yes	4.27E+05	No	Yes	NA	--	No	EN	NA	--
Chlorobenzene	1	1	1.80E+02	1.80E+02	No	ND	--	No	5.00E+02	No	No	<Tier 1	5.00E+04	No
delta-BHC	1	1	1.30E-01	1.30E-01	No	1.25E-02	Yes	No	1.50E-01	No	No	<Tier 1	1.50E+01	No
Dinoseb	1	1	3.20E-01	3.20E-01	No	ND	--	No	7.00E+01	No	No	<Tier 1	7.00E+03	No
gamma-BHC (Lindane)	1	1	6.80E-02	6.80E-02	No	1.01E-02	Yes	No	1.00E+00	No	No	<Tier 1	1.00E+02	No
Iron	1	1	5.60E+04	5.60E+04	Yes	2.20E+04	Yes	Yes	5.00E+03	Yes	No	EN	5.00E+05	No
Lead	1	1	3.00E+00	3.00E+00	No	ND	--	No	1.00E+02	No	No	<Tier 1	1.00E+04	No
Magnesium	1	1	6.00E+04	6.00E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	1	1	2.10E+03	2.10E+03	No	1.75E+03	Yes	No	1.00E+04	No	No	<Tier 1	1.00E+06	No
Pentachlorophenol	1	1	6.70E-02	6.70E-02	No	ND	--	No	5.00E+00	No	No	<Tier 1	5.00E+02	No
Potassium	1	1	1.40E+04	1.40E+04	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	1	1	2.30E+05	2.30E+05	Yes	1.30E+05	Yes	Yes	NA	--	No	EN	NA	--
Total TCDD-TEQ	1	1	1.03E-05	1.03E-05	No	5.02E-07	Yes	No	3.00E-05	No	No	<Tier 1	3.00E-03	No

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: G
Well: EEG-107

	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
Constituent	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
1,2,4-Trichlorobenzene	1	1	1.80E+02	1.80E+02	No	ND	--	No	7.00E+02	No	No	<Tier 1	7.00E+04	No
1,2-Dichlorobenzene	1	1	3.00E+02	3.00E+02	No	ND	--	No	1.50E+03	No	No	<Tier 1	1.50E+05	No
1,4-Dichlorobenzene	1	1	8.50E+02	8.50E+02	No	ND	--	No	3.75E+02	Yes	Yes	>Tier 1	3.75E+04	No
2,4,5-T	1	1	2.40E+01	2.40E+01	No	4.20E-01	Yes	No	3.60E+02	No	No	<Tier 1	3.60E+04	No
2,4-D	1	1	1.20E+02	1.20E+02	No	ND	--	No	3.50E+02	No	No	<Tier 1	3.50E+04	No
2,4-Dichlorophenol	1	1	3.60E+03	3.60E+03	No	ND	--	No	2.10E+01	Yes	Yes	>Tier 1	2.10E+03	Yes
2-Chlorophenol	1	1	6.30E+02	6.30E+02	No	ND	--	No	1.75E+02	Yes	Yes	>Tier 1	1.75E+04	No
2-Methylphenol (o-cresol)	1	1	2.30E+02	2.30E+02	No	ND	--	No	3.50E+02	No	No	<Tier 1	3.50E+04	No
3-Methylphenol/4-Methylphenol	1	1	2.40E+03	2.40E+03	No	ND	--	No	3.50E+02	Yes	Yes	>Tier 1	3.50E+04	No
4-Chloroaniline	1	1	2.30E+04	2.30E+04	No	ND	--	No	2.80E+01	Yes	Yes	>Tier 1	2.80E+03	Yes
4-Methyl-2-pentanone (MIBK)	1	1	1.30E+03	1.30E+03	No	ND	--	No	1.60E+02	Yes	Yes	>Tier 1	1.60E+04	No
Acetone	1	1	5.90E+02	5.90E+02	No	ND	--	No	7.00E+02	No	No	<Tier 1	7.00E+04	No
alpha-BHC	1	1	6.00E+00	6.00E+00	No	ND	--	No	1.50E-01	Yes	Yes	>Tier 1	1.50E+01	No
Aluminum	1	1	6.10E+02	6.10E+02	No	ND	--	No	3.60E+04	No	No	<Tier 1	3.60E+06	No
Antimony	1	1	8.60E+00	8.60E+00	No	ND	--	No	2.40E+01	No	No	<Tier 1	2.40E+03	No
Arsenic	1	1	1.40E+01	1.40E+01	No	1.17E+01	Yes	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Barium	1	1	4.20E+02	4.20E+02	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Benzene	1	1	3.70E+03	3.70E+03	No	ND	--	No	2.50E+01	Yes	Yes	>Tier 1	2.50E+03	Yes
Cadmium	1	1	2.60E+00	2.60E+00	No	ND	--	No	5.00E+01	No	No	<Tier 1	5.00E+03	No
Calcium	1	1	5.20E+05	5.20E+05	Yes	4.27E+05	Yes	Yes	NA	--	No	EN	NA	--
Chlorobenzene	1	1	4.30E+03	4.30E+03	No	ND	--	No	5.00E+02	Yes	Yes	>Tier 1	5.00E+04	No
Chromium	1	1	2.20E+01	2.20E+01	No	1.05E+02	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Cis/Trans-1,2-Dichloroethene	1	1	1.90E+02	1.90E+02	No	ND	--	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Cobalt	1	1	1.40E+02	1.40E+02	No	1.14E+01	Yes	No	1.00E+03	No	No	<Tier 1	1.00E+05	No
Copper	1	1	1.10E+01	1.10E+01	No	ND	--	No	6.50E+02	No	No	<Tier 1	6.50E+04	No
delta-BHC	1	1	1.70E+01	1.70E+01	No	1.25E-02	Yes	No	1.50E-01	Yes	Yes	>Tier 1	1.50E+01	Yes
Dichloroprop	1	1	4.70E+01	4.70E+01	No	ND	--	No	NA	--	No	No D/R	NA	--
Ethylbenzene	1	1	3.20E+01	3.20E+01	No	ND	--	No	1.00E+03	No	No	<Tier 1	1.00E+05	No
Iron	1	1	2.70E+05	2.70E+05	Yes	2.20E+04	Yes	Yes	5.00E+03	Yes	No	EN	5.00E+05	No
Lead	1	1	2.40E+01	2.40E+01	No	ND	--	No	1.00E+02	No	No	<Tier 1	1.00E+04	No
Magnesium	1	1	4.90E+04	4.90E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	1	1	6.10E+03	6.10E+03	No	1.75E+03	Yes	No	1.00E+04	No	No	<Tier 1	1.00E+06	No
Molybdenum	1	1	5.60E+01	5.60E+01	No	ND	--	No	1.80E+02	No	No	<Tier 1	1.80E+04	No
Naphthalene	1	1	2.10E+03	2.10E+03	No	ND	--	No	3.90E+01	Yes	Yes	>Tier 1	3.90E+03	No
Nickel	1	1	1.20E+02	1.20E+02	No	1.30E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Pentachlorophenol	2	2	1.01E+03	2.00E+03	No	ND	--	No	5.00E+00	Yes	Yes	>Tier 1	5.00E+02	Yes
Phenol	1	1	1.40E+04	1.40E+04	No	ND	--	No	1.00E+02	Yes	Yes	>Tier 1	1.00E+04	Yes
Potassium	1	1	2.80E+04	2.80E+04	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Selenium	1	1	5.00E+00	5.00E+00	No	ND	--	No	5.00E+01	No	No	<Tier 1	5.00E+03	No
Sodium	1	1	1.50E+05	1.50E+05	Yes	1.30E+05	Yes	Yes	NA	--	No	EN	NA	--
Tetrachloroethene	1	1	1.70E+02	1.70E+02	No	ND	--	No	2.50E+01	Yes	Yes	>Tier 1	2.50E+03	No
Toluene	1	1	8.50E+03	8.50E+03	No	ND	--	No	2.50E+03	Yes	Yes	>Tier 1	2.50E+05	No
Total TCDD-TEQ	1	1	3.65E-03	3.65E-03	No	5.02E-07	Yes	No	3.00E-05	Yes	Yes	>Tier 1	3.00E-03	Yes
Trichloroethene	1	1	2.00E+02	2.00E+02	No	ND	--	No	2.50E+01	Yes	Yes	>Tier 1	2.50E+03	No
Vanadium	1	1	3.30E+02	3.30E+02	No	ND	--	No	4.90E+01	Yes	Yes	>Tier 1	4.90E+03	No
Vinyl chloride	1	1	4.10E+01	4.10E+01	No	ND	--	No	1.00E+01	Yes	Yes	>Tier 1	1.00E+03	No
Xylenes, Total	1	1	1.30E+02	1.30E+02	No	ND	--	No	1.00E+04	No	No	<Tier 1	1.00E+06	No
Zinc	1	1	1.30E+03	1.30E+03	No	ND	--	No	1.00E+04	No	No	<Tier 1	1.00E+06	No

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: G
Well: EEG-112

	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
Constituent	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
4-Chloroaniline	1	1	1.10E+00	1.10E+00	No	ND	--	No	2.80E+01	No	No	<Tier 1	2.80E+03	No
Arsenic	1	1	5.50E+01	5.50E+01	No	1.17E+01	Yes	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Barium	1	1	3.40E+02	3.40E+02	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Benzene	1	1	1.90E+00	1.90E+00	No	ND	--	No	2.50E+01	No	No	<Tier 1	2.50E+03	No
Calcium	1	1	1.00E+05	1.00E+05	Yes	4.27E+05	No	Yes	NA	--	No	EN	NA	--
Chlorobenzene	1	1	2.80E+00	2.80E+00	No	ND	--	No	5.00E+02	No	No	<Tier 1	5.00E+04	No
Iron	1	1	2.70E+04	2.70E+04	Yes	2.20E+04	Yes	Yes	5.00E+03	Yes	No	EN	5.00E+05	No
Magnesium	1	1	2.30E+04	2.30E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	1	1	1.10E+03	1.10E+03	No	1.75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Molybdenum	1	1	3.10E+00	3.10E+00	No	ND	--	No	1.80E+02	No	No	<Tier 1	1.80E+04	No
Potassium	1	1	6.30E+03	6.30E+03	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	1	1	5.80E+04	5.80E+04	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Total TCDD-TEQ	1	1	3.90E-06	3.90E-06	No	5.02E-07	Yes	No	3.00E-05	No	No	<Tier 1	3.00E-03	No

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: G
Well: EE-05

Constituent	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
1,2,4-Trichlorobenzene	1	1	1.60E+00	1.60E+00	No	ND	--	No	7.00E+02	No	No	<Tier 1	7.00E+04	No
1,2-Dichlorobenzene	1	1	5.70E+00	5.70E+00	No	ND	--	No	1.50E+03	No	No	<Tier 1	1.50E+05	No
1,3-Dichlorobenzene	1	1	1.90E+00	1.90E+00	No	ND	--	No	1.50E+03	No	No	<Tier 1	1.50E+05	No
1,4-Dichlorobenzene	1	1	1.60E+01	1.60E+01	No	ND	--	No	3.75E+02	No	No	<Tier 1	3.75E+04	No
2,4,5-TP (Silvex)	1	1	3.90E+02	3.90E+02	No	3.20E-01	Yes	No	2.50E+02	Yes	Yes	>Tier 1	2.50E+04	No
2,4-Dichlorophenol	1	1	3.10E+00	3.10E+00	No	ND	--	No	2.10E+01	No	No	<Tier 1	2.10E+03	No
2-Chlorophenol	1	1	3.80E+01	3.80E+01	No	ND	--	No	1.75E+02	No	No	<Tier 1	1.75E+04	No
2-Methylphenol (o-cresol)	1	1	2.60E+01	2.60E+01	No	ND	--	No	3.50E+02	No	No	<Tier 1	3.50E+04	No
3-Methylphenol/4-Methylphenol	1	1	1.30E+02	1.30E+02	No	ND	--	No	3.50E+02	No	No	<Tier 1	3.50E+04	No
4,4'-DDD	1	1	2.40E-02	2.40E-02	No	ND	--	No	5.50E-01	No	No	<Tier 1	5.50E+01	No
4,4'-DDE	1	1	1.40E-03	1.40E-03	No	ND	--	No	2.00E-01	No	No	<Tier 1	2.00E+01	No
4-Chloroaniline	1	1	1.60E+03	1.60E+03	No	ND	--	No	2.80E+01	Yes	Yes	>Tier 1	2.80E+03	No
4-Nitroaniline	1	1	8.40E+00	8.40E+00	No	ND	--	No	2.10E+00	Yes	Yes	>Tier 1	2.10E+02	No
alpha-BHC	1	1	2.40E-02	2.40E-02	No	ND	--	No	1.50E-01	No	No	<Tier 1	1.50E+01	No
Arsenic	1	1	4.50E+01	4.50E+01	No	1.17E+01	Yes	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Barium	1	1	4.00E+02	4.00E+02	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Benzene	1	1	1.10E+02	1.10E+02	No	ND	--	No	2.50E+01	Yes	Yes	>Tier 1	2.50E+03	No
Calcium	1	1	2.70E+05	2.70E+05	Yes	4.27E+05	No	Yes	NA	--	No	EN	NA	--
Chlorobenzene	1	1	6.20E+02	6.20E+02	No	ND	--	No	5.00E+02	Yes	Yes	>Tier 1	5.00E+04	No
Cis/Trans-1,2-Dichloroethene	1	1	4.20E+01	4.20E+01	No	ND	--	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Cobalt	1	1	7.00E+00	7.00E+00	No	1.14E+01	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
delta-BHC	1	1	3.60E-01	3.60E-01	No	1.25E-02	Yes	No	1.50E-01	Yes	Yes	>Tier 1	1.50E+01	No
Dieldrin	1	1	2.00E-02	2.00E-02	No	ND	--	No	1.00E-01	No	No	<Tier 1	1.00E+01	No
Diethylphthalate	1	1	7.10E+00	7.10E+00	No	7.00E-01	Yes	No	5.60E+03	No	No	<Tier 1	5.60E+05	No
Endrin	1	1	2.40E-02	2.40E-02	No	ND	--	No	1.00E+01	No	No	<Tier 1	1.00E+03	No
Endrin aldehyde	1	1	9.20E-02	9.20E-02	No	ND	--	No	1.00E+01	No	No	<Tier 1	1.00E+03	No
Gamma Chlordane	1	1	8.00E-03	8.00E-03	No	ND	--	No	1.00E+01	No	No	<Tier 1	1.00E+03	No
Heptachlor	1	1	2.60E-02	2.60E-02	No	2.60E-02	Yes	No	2.00E+00	No	No	<Tier 1	2.00E+02	No
Heptachlor epoxide	1	1	2.40E-02	2.40E-02	No	2.66E-02	No	Yes	1.00E+00	No	No	<Tier 1	1.00E+02	No
Iron	1	1	4.60E+04	4.60E+04	Yes	2.20E+04	Yes	Yes	5.00E+03	Yes	No	EN	5.00E+05	No
Magnesium	1	1	5.20E+04	5.20E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	1	1	1.10E+03	1.10E+03	No	1.75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Methoxychlor	1	1	6.90E-02	6.90E-02	No	ND	--	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Molybdenum	1	1	4.50E+02	4.50E+02	No	ND	--	No	1.80E+02	Yes	Yes	>Tier 1	1.80E+04	No
Naphthalene	1	1	3.90E+02	3.90E+02	No	ND	--	No	3.90E+01	Yes	Yes	>Tier 1	3.90E+03	No
Nickel	1	1	5.90E+00	5.90E+00	No	1.30E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Phenol	1	1	3.80E+02	3.80E+02	No	ND	--	No	1.00E+02	Yes	Yes	>Tier 1	1.00E+04	No
Potassium	1	1	3.50E+03	3.50E+03	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	1	1	5.90E+04	5.90E+04	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Toluene	1	1	9.70E+02	9.70E+02	No	ND	--	No	2.50E+03	No	No	<Tier 1	2.50E+05	No
Total TCDD-TEQ	1	1	1.78E-04	1.78E-04	No	5.02E-07	Yes	No	3.00E-05	Yes	Yes	>Tier 1	3.00E-03	No
Trichloroethene	1	1	1.80E+01	1.80E+01	No	ND	--	No	2.50E+01	No	No	<Tier 1	2.50E+03	No
Vanadium	1	1	3.70E+00	3.70E+00	No	ND	--	No	4.90E+01	No	No	<Tier 1	4.90E+03	No

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: H
Well: EE-01

	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
Constituent	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
1,1,2,2-Tetrachloroethane	1	1	1.20E+01	1.20E+01	No	ND	--	No	5.50E-02	Yes	Yes	>Tier 1	5.50E+00	Yes
1,2,4-Trichlorobenzene	1	1	1.90E+01	1.90E+01	No	ND	--	No	7.00E+02	No	No	<Tier 1	7.00E+04	No
1,2-Dichlorobenzene	1	1	7.20E+02	7.20E+02	No	ND	--	No	1.50E+03	No	No	<Tier 1	1.50E+05	No
1,4-Dichlorobenzene	1	1	2.20E+03	2.20E+03	No	ND	--	No	3.75E+02	Yes	Yes	>Tier 1	3.75E+04	No
2,4,5-Trichlorophenol	1	1	6.20E+01	6.20E+01	No	ND	--	No	3.50E+03	No	No	<Tier 1	3.50E+05	No
2,4,6-Trichlorophenol	1	1	2.70E+02	2.70E+02	No	ND	--	No	3.20E+01	Yes	Yes	>Tier 1	3.20E+03	No
2-Chloronaphthalene	1	1	1.20E+01	1.20E+01	No	ND	--	No	4.90E+02	No	No	<Tier 1	4.90E+04	No
2-Chlorophenol	1	1	7.30E+01	7.30E+01	No	ND	--	No	1.75E+02	No	No	<Tier 1	1.75E+04	No
2-Methylnaphthalene	1	1	8.00E+00	8.00E+00	No	ND	--	No	3.90E+01	No	No	<Tier 1	3.90E+03	No
2-Methylphenol (o-cresol)	1	1	3.00E+01	3.00E+01	No	ND	--	No	3.50E+02	No	No	<Tier 1	3.50E+04	No
3-Methylphenol/4-Methylphenol	1	1	6.20E+01	6.20E+01	No	ND	--	No	3.50E+02	No	No	<Tier 1	3.50E+04	No
4-Chloroaniline	1	1	1.80E+03	1.80E+03	No	ND	--	No	2.80E+01	Yes	Yes	>Tier 1	2.80E+03	No
Acenaphthene	1	1	2.20E+00	2.20E+00	No	ND	--	No	2.10E+03	No	No	<Tier 1	2.10E+05	No
Aluminum	1	1	3.00E+02	3.00E+02	No	ND	--	No	3.60E+04	No	No	<Tier 1	3.60E+06	No
Arsenic	1	1	3.70E+01	3.70E+01	No	1.17E+01	Yes	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Barium	1	1	5.70E+02	5.70E+02	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Benzene	1	1	1.50E+03	1.50E+03	No	ND	--	No	2.50E+01	Yes	Yes	>Tier 1	2.50E+03	No
Cadmium	1	1	2.20E+00	2.20E+00	No	ND	--	No	5.00E+01	No	No	<Tier 1	5.00E+03	No
Calcium	1	1	3.30E+05	3.30E+05	Yes	4.27E+05	No	Yes	NA	--	No	EN	NA	--
Carbazole	1	1	5.20E+00	5.20E+00	No	ND	--	No	3.40E+00	Yes	Yes	>Tier 1	3.40E+02	No
Chlorobenzene	1	1	1.20E+03	1.20E+03	No	ND	--	No	5.00E+02	Yes	Yes	>Tier 1	5.00E+04	No
Chromium	1	1	4.20E+00	4.20E+00	No	1.05E+02	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Cobalt	1	1	1.30E+02	1.30E+02	No	1.14E+01	Yes	No	1.00E+03	No	No	<Tier 1	1.00E+05	No
Copper	1	1	1.80E+01	1.80E+01	No	ND	--	No	6.50E+02	No	No	<Tier 1	6.50E+04	No
Ethylbenzene	1	1	1.80E+03	1.80E+03	No	ND	--	No	1.00E+03	Yes	Yes	>Tier 1	1.00E+05	No
Fluorene	1	1	3.00E+01	3.00E+01	No	4.80E-01	Yes	No	1.40E+03	No	No	<Tier 1	1.40E+05	No
Iron	1	1	7.70E+04	7.70E+04	Yes	2.20E+04	Yes	Yes	5.00E+03	Yes	No	EN	5.00E+05	No
Magnesium	1	1	6.00E+04	6.00E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	1	1	1.60E+03	1.60E+03	No	1.75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Naphthalene	1	1	2.30E+03	2.30E+03	No	ND	--	No	3.90E+01	Yes	Yes	>Tier 1	3.90E+03	No
Nickel	1	1	6.70E+02	6.70E+02	No	1.30E+02	Yes	No	2.00E+03	No	No	<Tier 1	2.00E+05	No
N-Nitrosodiphenylamine	1	1	7.60E+00	7.60E+00	No	5.00E-01	Yes	No	5.00E+01	No	No	<Tier 1	5.00E+03	No
Pentachlorophenol	2	2	3.35E+03	4.30E+03	No	ND	--	No	5.00E+00	Yes	Yes	>Tier 1	5.00E+02	Yes
Phenanthrene	1	1	4.80E+00	4.80E+00	No	ND	--	No	1.05E+04	No	No	<Tier 1	1.05E+06	No
Phenol	1	1	7.20E+01	7.20E+01	No	ND	--	No	1.00E+02	No	No	<Tier 1	1.00E+04	No
Potassium	1	1	2.70E+04	2.70E+04	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	1	1	5.10E+04	5.10E+04	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Toluene	1	1	9.40E+01	9.40E+01	No	ND	--	No	2.50E+03	No	No	<Tier 1	2.50E+05	No
Total TCDD-TEQ	1	1	4.57E-05	4.57E-05	No	5.02E-07	Yes	No	3.00E-05	Yes	Yes	>Tier 1	3.00E-03	No
Xylenes, Total	1	1	2.00E+02	2.00E+02	No	ND	--	No	1.00E+04	No	No	<Tier 1	1.00E+06	No
Zinc	1	1	4.80E+02	4.80E+02	No	ND	--	No	1.00E+04	No	No	<Tier 1	1.00E+06	No

H-16

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area H
Well EE-02

Constituent	Summary Statistics: Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	COPC Selection - Chronic Exposure Screen: Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	Short-Term Exposure Screen: 100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
1,2,4-Trichlorobenzene	1	1	3 15E+02	3.15E+02	No	ND	--	No	7.00E+02	No	No	<Tier 1	7 00E+04	No
1,2-Dichlorobenzene	1	1	2 20E+02	2 20E+02	No	ND	--	No	1.60E+03	No	No	<Tier 1	1.60E+05	No
1,3-Dichlorobenzene	1	1	5 45E+00	5 45E+00	No	ND	--	No	1 60E+03	No	No	<Tier 1	1 60E+05	No
1,4-Dichlorobenzene	1	1	6 35E+02	6 35E+02	No	ND	--	No	3 75E+02	Yes	Yes	>Tier 1	3 75E+04	No
2,4,5-T	1	1	3 50E+01	3 50E+01	No	4 20E-01	Yes	No	3 60E+02	No	No	<Tier 1	3 60E+04	No
2,4,5-Trichlorophenol	1	1	1 90E+02	1 90E+02	No	ND	--	No	3 50E+03	No	No	<Tier 1	3 50E+05	No
2,4,6-Trichlorophenol	1	1	4 65E+02	4 65E+02	No	ND	--	No	3 20E+01	Yes	Yes	>Tier 1	3 20E+03	No
2,4-D	1	1	1 80E+02	1 80E+02	No	ND	--	No	3 50E+02	No	No	<Tier 1	3 50E+04	No
2,4-Dichlorophenol	1	1	3 70E+02	3 70E+02	No	ND	--	No	2 10E+01	Yes	Yes	>Tier 1	2 10E+03	No
2-Chlorophenol	1	1	2 25E+01	2 25E+01	No	ND	--	No	1.75E+02	No	No	<Tier 1	1.75E+04	No
2-Methylnaphthalene	1	1	1 80E+00	1.80E+00	No	ND	--	No	3 90E+01	No	No	<Tier 1	3 90E+03	No
2-Methylphenol (o-cresol)	1	1	2 80E+01	2 80E+01	No	ND	--	No	3 50E+02	No	No	<Tier 1	3 50E+04	No
2-Nitroaniline	1	1	1.35E+01	1 35E+01	No	ND	--	No	2 10E+00	Yes	Yes	>Tier 1	2 10E+02	No
3 Methylphenol/4-Methylphenol	1	1	2 15E+02	2 15E+02	No	ND	--	No	3 50E+02	No	No	<Tier 1	3 50E+04	No
4-Chloroaniline	1	1	7 75E+02	7 75E+02	No	ND	--	No	2 80E+01	Yes	Yes	>Tier 1	2 80E+03	No
Acetone	1	1	4 90E+02	4 90E+02	No	ND	--	No	7.00E+02	No	No	<Tier 1	7 00E+04	No
Alpha Chlordane	1	1	2 40E+00	2 40E+00	No	ND	--	No	1 00E+01	No	No	<Tier 1	1.00E+03	No
alpha-BHC	1	1	4 95E-01	4 95E-01	No	ND	--	No	1.50E-01	Yes	Yes	>Tier 1	1 50E+01	No
Antimony	1	1	1 05E+02	1.05E+02	No	ND	--	No	2 40E+01	Yes	Yes	>Tier 1	2 40E+03	No
Arsenic	1	1	1 25E+03	1 25E+03	No	1.17E+01	Yes	No	2 00E+02	Yes	Yes	>Tier 1	2.00E+04	No
Barium	1	1	6 35E+01	6 35E+01	No	6 17E+02	No	Yes	2 00E+03	No	No	<Tier 1	2 00E+05	No
Benzene	1	1	2 25E+03	2 25E+03	No	ND	--	No	2 50E+01	Yes	Yes	>Tier 1	2 50E+03	No
bis(2-Ethylhexyl)phthalate	1	1	7 40E-01	7 40E-01	No	ND	--	No	6 00E+01	No	No	<Tier 1	6 00E+03	No
Calcium	1	1	7.20E+05	7.20E+05	Yes	4 27E+05	Yes	Yes	NA	--	No	EN	NA	--
Carbazole	1	1	1 15E+00	1.15E+00	No	ND	--	No	3 40E+00	No	No	<Tier 1	3 40E+02	No
Chlorobenzene	1	1	4 35E+03	4 35E+03	No	ND	--	No	5 00E+02	Yes	Yes	>Tier 1	5 00E+04	No
Chloroform	1	1	4 25E+02	4 25E+02	No	ND	--	No	1 00E-01	Yes	Yes	>Tier 1	1 00E+01	Yes
Chromium	1	1	3 00E+00	3 00E+00	No	1 05E+02	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Cobalt	1	1	3 95E+01	3 95E+01	No	1 14E+01	Yes	No	1 00E+03	No	No	<Tier 1	1 00E+05	No
Copper	1	1	6 30E+00	6 30E+00	No	ND	--	No	6 50E+02	No	No	<Tier 1	6 50E+04	No
Cyanide, Total	1	1	1 80E+01	1 80E+01	No	ND	--	No	6 00E+02	No	No	<Tier 1	6 00E+04	No
Diethylphthalate	1	1	2 10E+01	2 10E+01	No	7 00E-01	Yes	No	5 60E+03	No	No	<Tier 1	5 60E+05	No
Dimethylphthalate	1	1	3 65E+00	3 65E+00	No	ND	--	No	3 60E+05	No	No	<Tier 1	3 60E+07	No
Endrin	1	1	3 60E-01	3 60E-01	No	ND	--	No	1 00E+01	No	No	<Tier 1	1 00E+03	No
Fluorene	1	1	1 00E+00	1 00E+00	No	4 80E-01	Yes	No	1 40E+03	No	No	<Tier 1	1 40E+05	No
Heptachlor epoxide	1	1	4 40E+00	4.40E+00	No	2 66E-02	Yes	No	1 00E+00	Yes	Yes	>Tier 1	1 00E+02	No
Iron	1	1	2 40E+04	2 40E+04	Yes	2 20E+04	Yes	Yes	5 00E+03	Yes	No	EN	5 00E+05	No
Magnesium	1	1	3 95E+04	3 95E+04	Yes	9 23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	1	1	6 80E+03	6 80E+03	No	1.75E+03	Yes	No	1 00E+04	No	No	<Tier 1	1 00E+06	No
Mercury	1	1	9 00E-02	9 00E-02	No	ND	--	No	1.00E+01	No	No	<Tier 1	1.00E+03	No
Methoxychlor	1	1	3 60E-01	3 60E-01	No	ND	--	No	2 00E+02	No	No	<Tier 1	2 00E+04	No
Molybdenum	1	1	5.45E+00	5 45E+00	No	ND	--	No	1 80E+02	No	No	<Tier 1	1 80E+04	No
Naphthalene	1	1	1 95E+02	1 95E+02	No	ND	--	No	3 90E+01	Yes	Yes	>Tier 1	3 90E+03	No
Nickel	1	1	4 30E+02	4 30E+02	No	1 30E+02	Yes	No	2 00E+03	No	No	<Tier 1	2 00E+05	No
Nitrobenzene	1	1	5 65E+01	5 65E+01	No	ND	--	No	3.50E+00	Yes	Yes	>Tier 1	3 50E+02	No
Pentachlorophenol	2	2	6 50E+02	6 70E+02	No	ND	--	No	5 00E+00	Yes	Yes	>Tier 1	5 00E+02	Yes
Phenol	1	1	3 15E+02	3 15E+02	No	ND	--	No	1 00E+02	Yes	Yes	>Tier 1	1 00E+04	No
Potassium	1	1	2 60E+04	2 60E+04	Yes	1 23E+05	No	Yes	NA	--	No	EN	NA	--
Selenium	1	1	7 15E+00	7 15E+00	No	ND		No	5 00E+01	No	No	<Tier 1	5 00E+03	No
Sodium	1	1	3 25E+04	3 25E+04	Yes	1 30E+05	No	Yes	NA	--	No	EN	NA	--
Thallium	1	1	5 05E+00	5 05E+00	No	ND	--	No	2 00E+01	No	No	<Tier 1	2 00E+03	No
Total TCDD-TEQ	1	1	2 31E-06	2 31E-06	No	5 02E-07	Yes	No	3 00E-05	No	No	<Tier 1	3 00E-03	No
Toluene	1	1	1 55E+03	1.55E+03	No	ND	--	No	2 50E+03	No	No	<Tier 1	2 50E+05	No
Trichloroethene	1	1	4 95E+01	4 95E+01	No	ND	--	No	2 50E+01	Yes	Yes	>Tier 1	2 50E+03	No
Vanadium	1	1	3 50E+00	3 50E+00	No	ND	--	No	4 90E+01	No	No	<Tier 1	4 90E+03	No
Zinc	1	1	6 05E+01	6 05E+01	No	ND	--	No	1 00E+04	No	No	<Tier 1	1 00E+06	No

H-17

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area H
Well EE-03

	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
Constituent	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
1,2-Dichlorobenzene	1	1	2.20E+00	2.20E+00	No	ND	--	No	1.50E+03	No	No	<Tier 1	1.50E+05	No
1,4-Dichlorobenzene	1	1	2.10E+01	2.10E+01	No	ND	--	No	3.75E+02	No	No	<Tier 1	3.75E+04	No
2,4-Dichlorophenol	1	1	7.50E-01	7.50E-01	No	ND	--	No	2.10E+01	No	No	<Tier 1	2.10E+03	No
Arsenic	1	1	2.80E+01	2.80E+01	No	1.17E+01	Yes	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Barium	1	1	1.30E+02	1.30E+02	No	6 17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2 00E+05	No
Calcium	1	1	2.60E+05	2.60E+05	Yes	4 27E+05	No	Yes	NA	--	No	EN	NA	--
Chlorobenzene	1	1	1.40E+01	1.40E+01	No	ND	--	No	5.00E+02	No	No	<Tier 1	5.00E+04	No
Iron	1	1	3 60E+04	3 60E+04	Yes	2 20E+04	Yes	Yes	5.00E+03	Yes	No	EN	5.00E+05	No
Magnesium	1	1	7.90E+04	7.90E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	1	1	1.40E+03	1.40E+03	No	1.75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Nickel	1	1	5.40E+00	5.40E+00	No	1.30E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Pentachlorophenol	2	1	1.75E+00	3.00E+00	No	ND	--	No	5.00E+00	No	No	<Tier 1	5.00E+02	No
Potassium	1	1	1.20E+04	1.20E+04	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	1	1	9.80E+04	9.80E+04	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Total TCDD-TEQ	1	1	5 02E-05	5.02E-05	No	5.02E-07	Yes	No	3.00E-05	Yes	Yes	>Tier 1	3.00E-03	No

H-18

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: H
Well EEG-110

	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
Constituent	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
Arsenic	1	1	4.50E+00	4.50E+00	No	1.17E+01	No	Yes	2.00E+02	No	No	<Tier 1	2.00E+04	No
Barium	1	1	1.20E+02	1.20E+02	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Cadmium	1	1	2.10E+00	2.10E+00	No	ND	--	No	5.00E+01	No	No	<Tier 1	5.00E+03	No
Calcium	1	1	1.20E+05	1.20E+05	Yes	4.27E+05	No	Yes	NA	--	No	EN	NA	--
Cobalt	1	1	1.90E+00	1.90E+00	No	1.14E+01	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
delta-BHC	1	1	1.60E-03	1.60E-03	No	1.25E-02	No	Yes	1.50E-01	No	No	<Tier 1	1.50E+01	No
Heptachlor	1	1	9.90E-03	9.90E-03	No	2.60E-02	No	Yes	2.00E+00	No	No	<Tier 1	2.00E+02	No
Iron	1	1	4.80E+02	4.80E+02	Yes	2.20E+04	No	Yes	5.00E+03	No	No	EN	5.00E+05	No
Magnesium	1	1	2.10E+04	2.10E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	1	1	1.60E+03	1.60E+03	No	1.75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Methylene chloride	1	1	3.20E+00	3.20E+00	No	ND	--	No	5.00E+01	No	No	<Tier 1	5.00E+03	No
Molybdenum	1	1	1.00E+01	1.00E+01	No	ND	--	No	1.80E+02	No	No	<Tier 1	1.80E+04	No
Nickel	1	1	1.50E+02	1.50E+02	No	1.30E+02	Yes	No	2.00E+03	No	No	<Tier 1	2.00E+05	No
Potassium	1	1	3.60E+03	3.60E+03	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	1	1	1.50E+04	1.50E+04	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Zinc	1	1	5.40E+02	5.40E+02	No	ND	--	No	1.00E+04	No	No	<Tier 1	1.00E+06	No

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: I
Well: AA-I-S1

Constituent	Summary Statistics: Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	COPC Selection - Chronic Exposure Screen: Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	Short-Term Exposure Screen: 100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
1,1-Dichloroethane	2	1	6.05E+02	9.60E+02	No	ND	--	No	3.50E+03	No	No	<Tier 1	3.50E+05	No
1,1-Dichloroethene	1	1	3.20E+01	3.20E+01	No	ND	--	No	3.50E+01	No	No	<Tier 1	3.50E+03	No
1,2-Dichlorobenzene	2	2	7.15E+01	1.30E+02	No	ND	--	No	1.50E+03	No	No	<Tier 1	1.50E+05	No
1,3-Dichlorobenzene	2	1	5.75E+01	1.10E+02	No	ND	--	No	1.50E+03	No	No	<Tier 1	1.50E+05	No
1,4-Dichlorobenzene	2	2	2.21E+03	4.40E+03	No	ND	--	No	3.75E+02	Yes	Yes	>Tier 1	3.75E+04	No
2,4,5-TP (Silvex)	2	2	7.25E-01	1.10E+00	No	3.20E-01	Yes	No	2.50E+02	No	No	<Tier 1	2.50E+04	No
2-Chlorophenol	2	1	5.25E+00	5.50E+00	No	ND	--	No	1.75E+02	No	No	<Tier 1	1.75E+04	No
4,4'-DDD	1	1	3.60E-03	3.60E-03	No	ND	--	No	5.50E-01	No	No	<Tier 1	5.50E+01	No
4,4'-DDT	1	1	2.20E-03	2.20E-03	No	ND	--	No	6.00E-01	No	No	<Tier 1	6.00E+01	No
4-Chloroaniline	2	2	3.25E+03	4.10E+03	No	ND	--	No	2.80E+01	Yes	Yes	>Tier 1	2.80E+03	Yes
Aldrin	2	2	4.10E-03	5.50E-03	No	ND	--	No	2.00E-01	No	No	<Tier 1	2.00E+01	No
alpha-BHC	2	2	3.30E-02	5.40E-02	No	ND	--	No	1.50E-01	No	No	<Tier 1	1.50E+01	No
Aluminum	2	2	7.65E+02	1.40E+03	No	ND	--	No	3.60E+04	No	No	<Tier 1	3.60E+06	No
Arsenic	2	2	1.04E+02	1.40E+02	No	1.17E+01	Yes	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Barium	2	2	5.35E+02	7.60E+02	No	6.17E+02	Yes	No	2.00E+03	No	No	<Tier 1	2.00E+05	No
Benzene	2	2	4.55E+02	6.20E+02	No	ND	--	No	2.50E+01	Yes	Yes	>Tier 1	2.50E+03	No
beta-BHC	2	1	4.90E-02	9.10E-02	No	ND	--	No	1.50E-01	No	No	<Tier 1	1.50E+01	No
bis(2-Chloroethyl)ether	1	1	1.10E+00	1.10E+00	No	ND	--	No	1.00E+01	No	No	<Tier 1	1.00E+03	No
bis(2-Ethylhexyl)phthalate	1	1	6.90E-01	6.90E-01	No	ND	--	No	6.00E+01	No	No	<Tier 1	6.00E+03	No
Calcium	2	2	2.55E+05	3.20E+05	Yes	4.27E+05	No	Yes	NA	--	No	EN	NA	--
Carbazole	1	1	1.40E+00	1.40E+00	No	ND	--	No	3.40E+00	No	No	<Tier 1	3.40E+02	No
Chlorobenzene	2	2	5.15E+03	8.70E+03	No	ND	--	No	5.00E+02	Yes	Yes	>Tier 1	5.00E+04	No
Chromium	1	1	3.10E+00	3.10E+00	No	1.05E+02	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Cis/Trans-1,2-Dichloroethene	2	1	7.25E+02	1.20E+03	No	ND	--	No	2.00E+02	Yes	Yes	>Tier 1	2.00E+04	No
Cobalt	2	1	7.50E+00	1.00E+01	No	1.14E+01	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
delta-BHC	2	2	6.80E-02	1.00E-01	No	1.25E-02	Yes	No	1.50E-01	No	No	<Tier 1	1.50E+01	No
Dicamba	1	1	1.40E-01	1.40E-01	No	ND	--	No	1.10E+03	No	No	<Tier 1	1.10E+05	No
Dieldrin	1	1	3.90E-03	3.90E-03	No	ND	--	No	1.00E-01	No	No	<Tier 1	1.00E+01	No
Dinoseb	1	1	2.70E-01	2.70E-01	No	ND	--	No	7.00E+01	No	No	<Tier 1	7.00E+03	No
Endosulfan II	1	1	1.00E-03	1.00E-03	No	ND	--	No	2.10E+02	No	No	<Tier 1	2.10E+04	No
Endrin	1	1	2.70E-03	2.70E-03	No	ND	--	No	1.00E+01	No	No	<Tier 1	1.00E+03	No
Endrin ketone	1	1	4.40E-03	4.40E-03	No	5.21E-02	No	Yes	1.00E+01	No	No	<Tier 1	1.00E+03	No
Ethylbenzene	2	2	5.55E+02	8.70E+02	No	ND	--	No	1.00E+03	No	No	<Tier 1	1.00E+05	No
gamma-BHC (Lindane)	2	1	3.93E-02	6.90E-02	No	1.01E-02	Yes	No	1.00E+00	No	No	<Tier 1	1.00E+02	No
Heptachlor	2	2	2.60E-02	2.80E-02	No	2.60E-02	Yes	No	2.00E+00	No	No	<Tier 1	2.00E+02	No
Heptachlor epoxide	2	2	1.09E-02	1.40E-02	No	2.66E-02	No	Yes	1.00E+00	No	No	<Tier 1	1.00E+02	No
Iron	2	2	4.90E+04	6.50E+04	Yes	2.20E+04	Yes	Yes	5.00E+03	Yes	No	EN	5.00E+05	No
Lead	2	1	2.65E+00	2.80E+00	No	ND	--	No	1.00E+02	No	No	<Tier 1	1.00E+04	No
Magnesium	2	2	6.30E+04	7.10E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	2	2	2.55E+03	3.70E+03	No	1.75E+03	Yes	No	1.00E+04	No	No	<Tier 1	1.00E+06	No
Molybdenum	2	1	6.40E+00	7.80E+00	No	ND	--	No	1.80E+02	No	No	<Tier 1	1.80E+04	No
Naphthalene	1	1	4.20E+00	4.20E+00	No	ND	--	No	3.90E+01	No	No	<Tier 1	3.90E+03	No
Nickel	2	1	3.40E+01	4.80E+01	No	1.30E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
N-Nitrosodiphenylamine	2	1	3.90E+00	5.30E+00	No	5.00E-01	Yes	No	5.00E+01	No	No	<Tier 1	5.00E+03	No
Pentachlorophenol	1	1	1.30E-01	1.30E-01	No	ND	--	No	5.00E+00	No	No	<Tier 1	5.00E+02	No
Potassium	2	2	1.14E+04	1.30E+04	Yes	1.23E+05	No	Yes	NA	--	No	BK	NA	--
Sodium	2	2	9.20E+04	1.30E+05	Yes	1.30E+05	No	Yes	NA	--	No	BK	NA	--
Toluene	1	1	1.80E+01	1.80E+01	No	ND	--	No	2.50E+03	No	No	<Tier 1	2.50E+05	No
Total PCBs	2	1	1.07E+00	1.13E+00	No	ND	--	No	2.50E+00	No	No	<Tier 1	2.50E+02	No
Vanadium	1	1	4.50E+00	4.50E+00	No	ND	--	No	4.90E+01	No	No	<Tier 1	4.90E+03	No
Vinyl chloride	2	1	7.35E+02	9.70E+02	No	ND	--	No	1.00E+01	Yes	Yes	>Tier 1	1.00E+03	No

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: I
Well: AA-I-S2

Constituent	Summary Statistics: Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	COPC Selection - Chronic Exposure Screen: Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	Short-Term Exposure Screen: 100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
1,1-Dichloroethane	2	2	1.70E+02	1.80E+02	No	ND	--	No	3.50E+03	No	No	<Tier 1	3.50E+05	No
1,1-Dichloroethene	1	1	3.10E+01	3.10E+01	No	ND	--	No	3.50E+01	No	No	<Tier 1	3.50E+03	No
1,2-Dichlorobenzene	2	1	7.25E+01	1.40E+02	No	ND	--	No	1.50E+03	No	No	<Tier 1	1.50E+05	No
1,3-Dichlorobenzene	2	1	6.25E+01	1.20E+02	No	ND	--	No	1.50E+03	No	No	<Tier 1	1.50E+05	No
1,4-Dichlorobenzene	2	2	2.15E+03	4.20E+03	No	ND	--	No	3.75E+02	Yes	Yes	>Tier 1	3.75E+04	No
2,4,5-TP (Silvex)	1	1	1.80E-01	1.80E-01	No	3.20E-01	No	Yes	2.50E+02	No	No	<Tier 1	2.50E+04	No
2,4-D	2	1	2.60E-01	2.70E-01	No	ND	--	No	3.50E+02	No	No	<Tier 1	3.50E+04	No
2,4-Dichlorophenol	2	1	5.80E+00	6.60E+00	No	ND	--	No	2.10E+01	No	No	<Tier 1	2.10E+03	No
2-Chlorophenol	2	1	5.15E+00	5.30E+00	No	ND	--	No	1.75E+02	No	No	<Tier 1	1.75E+04	No
4-Chloroaniline	2	2	3.51E+02	6.80E+02	No	ND	--	No	2.80E+01	Yes	Yes	>Tier 1	2.80E+03	No
alpha-BHC	1	1	8.40E-03	8.40E-03	No	ND	--	No	1.50E-01	No	No	<Tier 1	1.50E+01	No
Arsenic	2	1	2.30E+01	4.10E+01	No	1.17E+01	Yes	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Barium	2	2	6.30E+01	7.90E+01	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Benzene	2	2	6.13E+01	1.20E+02	No	ND	--	No	2.50E+01	Yes	Yes	>Tier 1	2.50E+03	No
Benzo(a)anthracene	1	1	5.90E-01	5.90E-01	No	ND	--	No	6.50E-01	No	No	<Tier 1	6.50E+01	No
Benzo(a)pyrene	1	1	9.80E-01	9.80E-01	No	ND	--	No	2.00E+00	No	No	<Tier 1	2.00E+02	No
Benzo(k)fluoranthene	1	1	1.20E+00	1.20E+00	No	ND	--	No	8.50E-01	Yes	Yes	>Tier 1	8.50E+01	No
Cadmium	2	1	3.63E+01	7.00E+01	No	ND	--	No	5.00E+01	Yes	Yes	>Tier 1	5.00E+03	No
Calcium	2	2	3.05E+05	3.50E+05	Yes	4.27E+05	No	Yes	NA	--	No	EN	NA	--
Chlorobenzene	2	2	1.66E+03	3.20E+03	No	ND	--	No	5.00E+02	Yes	Yes	>Tier 1	5.00E+04	No
Chrysene	1	1	7.30E-01	7.30E-01	No	ND	--	No	7.50E+00	No	No	<Tier 1	7.50E+02	No
Cis/Trans-1,2-Dichloroethene	2	2	4.05E+02	5.10E+02	No	ND	--	No	2.00E+02	Yes	Yes	>Tier 1	2.00E+04	No
Cobalt	2	2	4.35E+01	4.70E+01	No	1.14E+01	Yes	No	1.00E+03	No	No	<Tier 1	1.00E+05	No
delta-BHC	2	1	2.40E-02	4.20E-02	No	1.25E-02	Yes	No	1.50E-01	No	No	<Tier 1	1.50E+01	No
Dibenzo(a,h)anthracene	2	2	9.75E-01	1.10E+00	No	ND	--	No	1.50E+00	No	No	<Tier 1	1.50E+02	No
Ethylbenzene	2	1	1.11E+02	2.10E+02	No	ND	--	No	1.00E+03	No	No	<Tier 1	1.00E+05	No
Heptachlor	2	2	7.60E-03	8.30E-03	No	2.60E-02	No	Yes	2.00E+00	No	No	<Tier 1	2.00E+02	No
Iron	2	1	1.17E+04	2.30E+04	Yes	2.20E+04	Yes	Yes	5.00E+03	Yes	No	EN	5.00E+05	No
Magnesium	2	2	5.80E+04	6.50E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	2	2	4.85E+03	7.40E+03	No	1.75E+03	Yes	No	1.00E+04	No	No	<Tier 1	1.00E+06	No
Molybdenum	2	2	3.00E+00	3.10E+00	No	ND	--	No	1.80E+02	No	No	<Tier 1	1.80E+04	No
Nickel	2	2	4.40E+03	7.80E+03	No	1.30E+02	Yes	No	2.00E+03	Yes	Yes	>Tier 1	2.00E+05	No
Potassium	2	2	1.20E+04	1.30E+04	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	2	2	9.00E+04	1.20E+05	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Tetrachloroethene	1	1	7.40E+00	7.40E+00	No	ND	--	No	2.50E+01	No	No	<Tier 1	2.50E+03	No
Total TCDD-TEQ	1	1	1.88E-06	1.88E-06	No	5.02E-07	Yes	No	3.00E-05	No	No	<Tier 1	3.00E-03	No
Trichloroethene	2	1	1.04E+02	1.80E+02	No	ND	--	No	2.50E+01	Yes	Yes	>Tier 1	2.50E+03	No
Vanadium	1	1	2.70E+00	2.70E+00	No	ND	--	No	4.90E+01	No	No	<Tier 1	4.90E+03	No
Vinyl chloride	2	2	2.00E+02	2.40E+02	No	ND	--	No	1.00E+01	Yes	Yes	>Tier 1	1.00E+03	No
Zinc	2	2	1.83E+04	3.30E+04	No	ND	--	No	1.00E+04	Yes	Yes	>Tier 1	1.00E+06	No

H-21

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: I
Well: AA-I-S3

Constituent	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
Barium	1	1	3 30E+02	3 30E+02	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Benzo(a)pyrene	1	1	4.50E-01	4.50E-01	No	ND	--	No	2.00E+00	No	No	<Tier 1	2.00E+02	No
Benzo(b)fluoranthene	1	1	3 00E-01	3 00E-01	No	ND	--	No	9.00E-01	No	No	<Tier 1	9.00E+01	No
Calcium	1	1	2 40E+05	2.40E+05	Yes	4 27E+05	No	Yes	NA	--	No	EN	NA	--
Heptachlor	1	1	9 20E-03	9 20E-03	No	2 60E-02	No	Yes	2.00E+00	No	No	<Tier 1	2.00E+02	No
Magnesium	1	1	3.30E+04	3.30E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	1	1	4.30E+02	4.30E+02	No	1.75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Molybdenum	1	1	1.10E+01	1.10E+01	No	ND	--	No	1.80E+02	No	No	<Tier 1	1.80E+04	No
Potassium	1	1	1.70E+05	1.70E+05	Yes	1.23E+05	Yes	Yes	NA	--	No	EN	NA	--
Sodium	1	1	1.80E+05	1.80E+05	Yes	1.30E+05	Yes	Yes	NA	--	No	EN	NA	--
Total TCDD-TEQ	1	1	2.41E-06	2.41E-06	No	5.02E-07	Yes	No	3.00E-05	No	No	<Tier 1	3.00E-03	No

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: I
Well: EE-12

	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
Constituent	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
1,2,4-Trichlorobenzene	1	1	5.50E-01	5.50E-01	No	ND	--	No	7.00E+02	No	No	<Tier 1	7.00E+04	No
1,2-Dichlorobenzene	1	1	3.90E+00	3.90E+00	No	ND	--	No	1.50E+03	No	No	<Tier 1	1.50E+05	No
1,3-Dichlorobenzene	1	1	1.30E+01	1.30E+01	No	ND	--	No	1.50E+03	No	No	<Tier 1	1.50E+05	No
1,4-Dichlorobenzene	1	1	9.60E+01	9.60E+01	No	ND	--	No	3.75E+02	No	No	<Tier 1	3.75E+04	No
2,4,5-TP (Silvex)	1	1	4.50E-01	4.50E-01	No	3.20E-01	Yes	No	2.50E+02	No	No	<Tier 1	2.50E+04	No
2-Chlorophenol	1	1	1.00E+01	1.00E+01	No	ND	--	No	1.75E+02	No	No	<Tier 1	1.75E+04	No
2-Methylphenol (o-cresol)	1	1	3.90E-01	3.90E-01	No	ND	--	No	3.50E+02	No	No	<Tier 1	3.50E+04	No
3-Methylphenol/4-Methylphenol	1	1	4.80E+00	4.80E+00	No	ND	--	No	3.50E+02	No	No	<Tier 1	3.50E+04	No
4,4'-DDE	1	1	2.20E+00	2.20E+00	No	ND	--	No	2.00E-01	Yes	Yes	>Tier 1	2.00E+01	No
4-Chloroaniline	1	1	1.40E+03	1.40E+03	No	ND	--	No	2.80E+01	Yes	Yes	>Tier 1	2.80E+03	No
alpha-BHC	1	1	2.40E+00	2.40E+00	No	ND	--	No	1.50E-01	Yes	Yes	>Tier 1	1.50E+01	No
Aluminum	1	1	4.90E+03	4.90E+03	No	ND	--	No	3.60E+04	No	No	<Tier 1	3.60E+06	No
Arsenic	1	1	9.70E+00	9.70E+00	No	1.17E+01	No	Yes	2.00E+02	No	No	<Tier 1	2.00E+04	No
Barium	1	1	9.20E+02	9.20E+02	No	6.17E+02	Yes	No	2.00E+03	No	No	<Tier 1	2.00E+05	No
Benzene	1	1	6.80E+02	6.80E+02	No	ND	--	No	2.50E+01	Yes	Yes	>Tier 1	2.50E+03	No
bis(2-Ethylhexyl)phthalate	1	1	7.90E-01	7.90E-01	No	ND	--	No	6.00E+01	No	No	<Tier 1	6.00E+03	No
Cadmium	1	1	9.60E-01	9.60E-01	No	ND	--	No	5.00E+01	No	No	<Tier 1	5.00E+03	No
Calcium	1	1	4.80E+05	4.80E+05	Yes	4.27E+05	Yes	Yes	NA	--	No	EN	NA	--
Carbazole	1	1	3.50E+00	3.50E+00	No	ND	--	No	3.40E+00	Yes	Yes	>Tier 1	3.40E+02	No
Chlorobenzene	1	1	1.40E+03	1.40E+03	No	ND	--	No	5.00E+02	Yes	Yes	>Tier 1	5.00E+04	No
Chromium	1	1	7.30E+00	7.30E+00	No	1.05E+02	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Cobalt	1	1	2.80E+00	2.80E+00	No	1.14E+01	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Copper	1	1	1.00E+01	1.00E+01	No	ND	--	No	6.50E+02	No	No	<Tier 1	6.50E+04	No
Di-n-butylphthalate	1	1	1.40E+00	1.40E+00	No	ND	--	No	3.50E+03	No	No	<Tier 1	3.50E+05	No
Endosulfan II	1	1	2.00E+00	2.00E+00	No	ND	--	No	2.10E+02	No	No	<Tier 1	2.10E+04	No
Endrin ketone	1	1	1.80E+00	1.80E+00	No	5.21E-02	Yes	No	1.00E+01	No	No	<Tier 1	1.00E+03	No
Ethylbenzene	1	1	4.60E+00	4.60E+00	No	ND	--	No	1.00E+03	No	No	<Tier 1	1.00E+05	No
Fluoranthene	1	1	4.10E-01	4.10E-01	No	ND	--	No	1.40E+03	No	No	<Tier 1	1.40E+05	No
Gamma Chlordane	1	1	3.50E+00	3.50E+00	No	ND	--	No	1.00E+01	No	No	<Tier 1	1.00E+03	No
Heptachlor	1	1	2.50E+00	2.50E+00	No	2.60E-02	Yes	No	2.00E+00	Yes	Yes	>Tier 1	2.00E+02	No
Heptachlor epoxide	1	1	5.60E+00	5.60E+00	No	2.66E-02	Yes	No	1.00E+00	Yes	Yes	>Tier 1	1.00E+02	No
Iron	1	1	6.20E+04	6.20E+04	Yes	2.20E+04	Yes	Yes	5.00E+03	Yes	No	EN	5.00E+05	No
Magnesium	1	1	1.10E+05	1.10E+05	Yes	9.23E+04	Yes	Yes	NA	--	No	EN	NA	--
Manganese	1	1	6.80E+03	6.80E+03	No	1.75E+03	Yes	No	1.00E+04	No	No	<Tier 1	1.00E+06	No
Mercury	1	1	1.30E-01	1.30E-01	No	ND	--	No	1.00E+01	No	No	<Tier 1	1.00E+03	No
Methoxychlor	1	1	2.80E+00	2.80E+00	No	ND	--	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Naphthalene	1	1	6.50E+00	6.50E+00	No	ND	--	No	3.90E+01	No	No	<Tier 1	3.90E+03	No
Nickel	1	1	9.50E+00	9.50E+00	No	1.30E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Pentachlorophenol	1	1	6.70E-02	6.70E-02	No	ND	--	No	5.00E+00	No	No	<Tier 1	5.00E+02	No
Phenol	1	1	1.90E+01	1.90E+01	No	ND	--	No	1.00E+02	No	No	<Tier 1	1.00E+04	No
Potassium	1	1	2.60E+04	2.60E+04	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	1	1	2.40E+05	2.40E+05	Yes	1.30E+05	Yes	Yes	NA	--	No	EN	NA	--
Toluene	1	1	5.00E+00	5.00E+00	No	ND	--	No	2.50E+03	No	No	<Tier 1	2.50E+05	No
Total TCDD-TEQ	1	1	3.05E-03	3.05E-03	No	5.02E-07	Yes	No	3.00E-05	Yes	Yes	>Tier 1	3.00E-03	Yes
Vanadium	1	1	2.20E+01	2.20E+01	No	ND	--	No	4.90E+01	No	No	<Tier 1	4.90E+03	No
Xylenes, Total	1	1	1.40E+01	1.40E+01	No	ND	--	No	1.00E+04	No	No	<Tier 1	1.00E+06	No
Zinc	1	1	1.20E+02	1.20E+02	No	ND	--	No	1.00E+04	No	No	<Tier 1	1.00E+06	No

H-23

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: I
Well. EE-13

Constituent	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
Aluminum	1	1	1.50E+03	1.50E+03	No	ND	--	No	3.60E+04	No	No	<Tier 1	3.60E+06	No
Barium	1	1	1.70E+02	1.70E+02	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Calcium	1	1	1.50E+05	1.50E+05	Yes	4.27E+05	No	Yes	NA	--	No	EN	NA	--
Chromium	1	1	2.50E+00	2.50E+00	No	1.05E+02	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Cobalt	1	1	4.10E+00	4.10E+00	No	1.14E+01	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Copper	1	1	3.80E+00	3.80E+00	No	ND	--	No	6.50E+02	No	No	<Tier 1	6.50E+04	No
delta-BHC	1	1	2.10E-02	2.10E-02	No	1.25E-02	Yes	No	1.50E-01	No	No	<Tier 1	1.50E+01	No
Iron	1	1	2.10E+03	2.10E+03	Yes	2.20E+04	No	Yes	5.00E+03	No	No	EN	5.00E+05	No
Magnesium	1	1	3.10E+04	3.10E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	1	1	3.20E+02	3.20E+02	No	1.75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Nickel	1	1	1.10E+01	1.10E+01	No	1.30E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Pentachlorophenol	1	1	6.60E-02	6.60E-02	No	ND	--	No	5.00E+00	No	No	<Tier 1	5.00E+02	No
Potassium	1	1	7.60E+03	7.60E+03	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	1	1	3.70E+04	3.70E+04	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Total TCDD-TEQ	1	1	4.74E-05	4.74E-05	No	5.02E-07	Yes	No	3.00E-05	Yes	Yes	>Tier 1	3.00E-03	No
Vanadium	1	1	5.00E+00	5.00E+00	No	ND	--	No	4.90E+01	No	No	<Tier 1	4.90E+03	No
Zinc	1	1	1.00E+01	1.00E+01	No	ND	--	No	1.00E+04	No	No	<Tier 1	1.00E+06	No

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: I
Well. EE-14

	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
Constituent	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
1,2,4-Trichlorobenzene	1	1	5.10E+02	5.10E+02	No	ND	--	No	7.00E+02	No	No	<Tier 1	7.00E+04	No
1,2-Dichlorobenzene	1	1	5.00E+02	5.00E+02	No	ND	--	No	1.50E+03	No	No	<Tier 1	1.50E+05	No
1,3-Dichlorobenzene	1	1	4.50E+01	4.50E+01	No	ND	--	No	1.50E+03	No	No	<Tier 1	1.50E+05	No
1,4-Dichlorobenzene	1	1	1.40E+04	1.40E+04	No	ND	--	No	3.75E+02	Yes	Yes	>Tier 1	3.75E+04	No
2,4,5-Trichlorophenol	*1*	*1*	*1.60E+00*	*1.60E+00*	*No*	*ND*	--	*No*	3.50E+03	No	No	<Tier 1	3.50E+05	No
2,4,6-Trichlorophenol	1	1	1.50E+01	1.50E+01	No	ND	--	No	3.20E+01	No	No	<Tier 1	3.20E+03	No
2-Chlorophenol	1	1	2.70E+01	2.70E+01	No	ND	--	No	1.75E+02	No	No	<Tier 1	1.75E+04	No
2-Methylnaphthalene	1	1	4.20E+00	4.20E+00	No	ND	--	No	3.90E+01	No	No	<Tier 1	3.90E+03	No
2-Methylphenol (o-cresol)	1	1	2.10E+01	2.10E+01	No	ND	--	No	3.50E+02	No	No	<Tier 1	3.50E+04	No
3-Methylphenol/4-Methylphenol	1	1	1.10E+02	1.10E+02	No	ND	--	No	3.50E+02	No	No	<Tier 1	3.50E+04	No
4,4'-DDE	1	1	1.80E-01	1.80E-01	No	ND	--	No	2.00E-01	No	No	<Tier 1	2.00E+01	No
4-Chloroaniline	1	1	1.80E+03	1.80E+03	No	ND	--	No	2.80E+01	Yes	Yes	>Tier 1	2.80E+03	No
alpha-BHC	1	1	1.10E+00	1.10E+00	No	ND	--	No	1.50E-01	Yes	Yes	>Tier 1	1.50E+01	No
Arsenic	1	1	1.60E+01	1.60E+01	No	1.17E+01	Yes	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Barium	1	1	5.80E+02	5.80E+02	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Benzene	1	1	7.50E+02	7.50E+02	No	ND	--	No	2.50E+01	Yes	Yes	>Tier 1	2.50E+03	No
beta-BHC	1	1	1.00E+00	1.00E+00	No	ND	--	No	1.50E-01	Yes	Yes	>Tier 1	1.50E+01	No
bis(2-Ethylhexyl)phthalate	*1*	*1*	*1.10E+00*	*1.10E+00*	*No*	*ND*	--	*No*	*6.00E+01*	*No*	*No*	*<Tier 1*	*6.00E+03*	*No*
Butylbenzylphthalate	1	1	1.00E+01	1.00E+01	No	ND	--	No	7.00E+03	No	No	<Tier 1	7.00E+05	No
Calcium	1	1	1.90E+05	1.90E+05	Yes	4.27E+05	No	Yes	NA	--	No	EN	NA	--
Carbazole	1	1	2.60E+01	2.60E+01	No	ND	--	No	3.40E+00	Yes	Yes	>Tier 1	3.40E+02	No
Chlorobenzene	1	1	3.80E+03	3.80E+03	No	ND	--	No	5.00E+02	Yes	Yes	>Tier 1	5.00E+04	No
Chromium	1	1	7.80E+00	7.80E+00	No	1.05E+02	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Cis/Trans-1,2-Dichloroethene	1	1	1.60E+02	1.60E+02	No	ND	--	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Cobalt	1	1	4.00E+00	4.00E+00	No	1.14E+01	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Copper	1	1	1.90E+01	1.90E+01	No	ND	--	No	6.50E+02	No	No	<Tier 1	6.50E+04	No
Endrin ketone	1	1	1.10E-01	1.10E-01	No	5.21E-02	Yes	No	1.00E+01	No	No	<Tier 1	1.00E+03	No
Ethylbenzene	1	1	8.30E+01	8.30E+01	No	ND	--	No	1.00E+03	No	No	<Tier 1	1.00E+05	No
Gamma Chlordane	1	1	2.50E-01	2.50E-01	No	ND	--	No	1.00E+01	No	No	<Tier 1	1.00E+03	No
gamma-BHC (Lindane)	1	1	4.00E-01	4.00E-01	No	1.01E-02	Yes	No	1.00E+00	No	No	<Tier 1	1.00E+02	No
Heptachlor epoxide	1	1	6.80E-01	*6.80E-01*	*No*	*2.66E-02*	*Yes*	*No*	*1.00E+00*	*No*	*No*	*<Tier 1*	*1.00E+02*	No
Iron	1	1	6.40E+04	6.40E+04	Yes	2.20E+04	Yes	Yes	5.00E+03	Yes	No	EN	5.00E+05	No
Lead	1	1	2.20E+01	2.20E+01	No	ND	--	No	1.00E+02	No	No	<Tier 1	1.00E+04	No
Magnesium	1	1	4.90E+04	4.90E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	1	1	1.20E+03	1.20E+03	No	1.75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Mercury	1	1	1.80E-01	1.80E-01	No	ND	--	No	1.00E+01	No	No	<Tier 1	1.00E+03	No
Methoxychlor	1	1	2.20E-01	2.20E-01	No	ND	--	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Naphthalene	1	1	3.60E+01	3.60E+01	No	ND	--	No	3.90E+01	No	No	<Tier 1	3.90E+03	No
Nickel	1	1	1.50E+02	1.50E+02	No	1.30E+02	Yes	No	2.00E+03	No	No	<Tier 1	2.00E+05	No
N-Nitrosodiphenylamine	1	1	2.30E+01	2.30E+01	No	5.00E-01	Yes	No	5.00E+01	No	No	<Tier 1	5.00E+03	No
Pentachlorophenol	2	2	3.30E+02	5.00E+02	No	ND	--	No	5.00E+00	Yes	Yes	>Tier 1	5.00E+02	No
Phenol	1	1	1.70E+01	1.70E+01	No	ND	--	No	1.00E+02	No	No	<Tier 1	1.00E+04	No
Potassium	1	1	1.10E+04	1.10E+04	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	1	1	8.80E+04	8.80E+04	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Toluene	1	1	4.20E+01	4.20E+01	No	ND	--	No	2.50E+03	No	No	<Tier 1	2.50E+05	No
Total PCBs	1	1	5.88E+00	5.88E+00	No	ND	--	No	2.50E+00	Yes	Yes	>Tier 1	2.50E+02	No
Total TCDD-TEQ	1	1	7.69E-04	7.69E-04	No	5.02E-07	Yes	No	3.00E-05	Yes	Yes	>Tier 1	3.00E-03	No
Vanadium	1	1	5.70E+00	5.70E+00	No	ND	--	No	4.90E+01	No	No	<Tier 1	4.90E+03	No
Zinc	1	1	9.30E+01	9.30E+01	No	ND	--	No	1.00E+04	No	No	<Tier 1	1.00E+06	No

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: I
Well: EE-15

Constituent	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
1,1-Dichloroethane	1	1	1.10E+01	1.10E+01	No	ND	--	No	3.50E+03	No	No	<Tier 1	3.50E+05	No
1,2-Dichlorobenzene	1	1	2.40E+01	2.40E+01	No	ND	--	No	1.50E+03	No	No	<Tier 1	1.50E+05	No
1,3-Dichlorobenzene	1	1	1.10E+01	1.10E+01	No	ND	--	No	1.50E+03	No	No	<Tier 1	1.50E+05	No
1,4-Dichlorobenzene	1	1	4.30E+02	4.30E+02	No	ND	--	No	3.75E+02	Yes	Yes	>Tier 1	3.75E+04	No
2-Chlorophenol	1	1	3.15E+00	3.15E+00	No	ND	--	No	1.75E+02	No	No	<Tier 1	1.75E+04	No
4-Chloroaniline	1	1	7.25E+00	7.25E+00	No	ND	--	No	2.80E+01	No	No	<Tier 1	2.80E+03	No
Aluminum	1	1	4.25E+03	4.25E+03	No	ND	--	No	3.60E+04	No	No	<Tier 1	3.60E+06	No
Arsenic	1	1	2.10E+01	2.10E+01	No	1.17E+01	Yes	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Barium	1	1	2.55E+02	2.55E+02	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Benzene	1	1	3.90E+00	3.90E+00	No	ND	--	No	2.50E+01	No	No	<Tier 1	2.50E+03	No
Calcium	1	1	1.50E+05	1.50E+05	Yes	4.27E+05	No	Yes	NA	--	No	EN	NA	--
Chlorobenzene	1	1	1.95E+02	1.95E+02	No	ND	--	No	5.00E+02	No	No	<Tier 1	5.00E+04	No
Chromium	1	1	8.10E+00	8.10E+00	No	1.05E+02	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Cis/Trans-1,2-Dichloroethene	1	1	6.40E+01	6.40E+01	No	ND	--	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Cobalt	1	1	6.25E+00	6.25E+00	No	1.14E+01	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Copper	1	1	8.45E+00	8.45E+00	No	ND	--	No	6.50E+02	No	No	<Tier 1	6.50E+04	No
gamma-BHC (Lindane)	1	1	5.30E-03	5.30E-03	No	1.01E-02	No	Yes	1.00E+00	No	No	<Tier 1	1.00E+02	No
Iron	1	1	3.50E+04	3.50E+04	Yes	2.20E+04	Yes	Yes	5.00E+03	Yes	No	EN	5.00E+05	No
Magnesium	1	1	4.05E+04	4.05E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	1	1	1.15E+03	1.15E+03	No	1.75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Mercury	1	1	1.10E-01	1.10E-01	No	ND	--	No	1.00E+01	No	No	<Tier 1	1.00E+03	No
Nickel	1	1	1.90E+01	1.90E+01	No	1.30E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Potassium	1	1	6.15E+03	6.15E+03	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	1	1	3.05E+04	3.05E+04	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Total TCDD-TEQ	1	1	2.95E-06	2.95E-06	No	5.02E-07	Yes	No	3.00E-05	No	No	<Tier 1	3.00E-03	No
Trichloroethene	1	1	6.55E-01	6.55E-01	No	ND	--	No	2.50E+01	No	No	<Tier 1	2.50E+03	No
Vanadium	1	1	1.62E+01	1.62E+01	No	ND	--	No	4.90E+01	No	No	<Tier 1	4.90E+03	No
Zinc	1	1	2.71E+01	2.71E+01	No	ND	--	No	1.00E+04	No	No	<Tier 1	1.00E+06	No

H-26

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: L
Well EEG-103

Constituent	Summary Statistics: Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	COPC Selection - Chronic Exposure Screen: Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	Short-Term Exposure Screen: 100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
Aluminum	1	1	4.20E+01	4.20E+01	No	ND	--	No	3.60E+04	No	No	<Tier 1	3.60E+06	No
Arsenic	1	1	1.40E+01	1.40E+01	No	1.17E+01	Yes	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Barium	1	1	1.70E+02	1.70E+02	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Calcium	1	1	9.70E+04	9.70E+04	Yes	4.27E+05	No	Yes	NA	--	No	EN	NA	--
Cobalt	1	1	1.90E+00	1.90E+00	No	1.14E+01	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Copper	1	1	1.60E+00	1.60E+00	No	ND	--	No	6.50E+02	No	No	<Tier 1	6.50E+04	No
Iron	1	1	1.40E+03	1.40E+03	Yes	2.20E+04	No	Yes	5.00E+03	No	No	EN	5.00E+05	No
Magnesium	1	1	2.10E+04	2.10E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	1	1	2.70E+02	2.70E+02	No	1.75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Molybdenum	1	1	7.90E+00	7.90E+00	No	ND	--	No	1.80E+02	No	No	<Tier 1	1.80E+04	No
Nickel	1	1	4.90E+00	4.90E+00	No	1.30E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Potassium	1	1	4.10E+03	4.10E+03	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	1	1	1.60E+04	1.60E+04	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Total TCDD-TEQ	1	1	3.58E-06	3.58E-06	No	5.02E-07	Yes	No	3.00E-05	No	No	<Tier 1	3.00E-03	No

H-27

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: L
Well EEG-105

Constituent	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
alpha-BHC	1	1	3 10E-03	3.10E-03	No	ND	--	No	1.50E-01	No	No	<Tier 1	1.50E+01	No
Barium	1	1	1.30E+02	1.30E+02	No	6 17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Calcium	1	1	8 60E+04	8 60E+04	Yes	4 27E+05	No	Yes	NA	--	No	EN	NA	--
Cobalt	1	1	1.60E+00	1.60E+00	No	1.14E+01	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
delta-BHC	1	1	1.20E-02	1.20E-02	No	1.25E-02	No	Yes	1.50E-01	No	No	<Tier 1	1.50E+01	No
gamma-BHC (Lindane)	1	1	7.40E-03	7 40E-03	No	1.01E-02	No	Yes	1.00E+00	No	No	<Tier 1	1.00E+02	No
Iron	1	1	2.80E+02	2.80E+02	Yes	2.20E+04	No	Yes	5.00E+03	No	No	EN	5.00E+05	No
Magnesium	1	1	1.50E+04	1.50E+04	Yes	9 23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	1	1	4.50E+02	4.50E+02	No	1.75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Molybdenum	1	1	5.70E+00	5.70E+00	No	ND	--	No	1.80E+02	No	No	<Tier 1	1.80E+04	No
Nickel	1	1	6.70E+00	6.70E+00	No	1.30E+02	No	Yes	2.00E+03	No	No	<Tier 1	2 00E+05	No
Pentachlorophenol	1	1	9.70E-02	9.70E-02	No	ND	--	No	5.00E+00	No	No	<Tier 1	5.00E+02	No
Potassium	1	1	7.70E+03	7.70E+03	Yes	1 23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	1	1	1.90E+04	1.90E+04	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Total TCDD-TEQ	1	1	2.90E-06	2.90E-06	No	5.02E-07	Yes	No	3.00E-05	No	No	<Tier 1	3.00E-03	No

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: L
Well EEG-109

Constituent	Summary Statistics: Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	COPC Selection - Chronic Exposure Screen: Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	Short-Term Exposure Screen: 100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
2,4,5-T	1	1	3.20E+00	3 20E+00	No	4.20E-01	Yes	No	3.60E+02	No	No	<Tier 1	3.60E+04	No
2,4-D	1	1	6 10E+00	6.10E+00	No	ND	--	No	3.50E+02	No	No	<Tier 1	3.50E+04	No
2,4-Dichlorophenol	1	1	2.60E+01	2.60E+01	No	ND	--	No	2.10E+01	Yes	Yes	>Tier 1	2.10E+03	No
2-Chlorophenol	1	1	2.10E+01	2.10E+01	No	ND	--	No	1.75E+02	No	No	<Tier 1	1.75E+04	No
3-Methylphenol/4-Methylphenol	1	1	5 50E+00	5 50E+00	No	ND	--	No	3.50E+02	No	No	<Tier 1	3 50E+04	No
4,4'-DDD	1	1	4.40E-02	4.40E-02	No	ND	--	No	5.50E-01	No	No	<Tier 1	5.50E+01	No
4-Chloroaniline	1	1	5 50E+01	5 50E+01	No	ND	--	No	2.80E+01	Yes	Yes	>Tier 1	2.80E+03	No
4-Methyl-2-pentanone (MIBK)	1	1	5.00E+01	5.00E+01	No	ND	--	No	1.60E+02	No	No	<Tier 1	1.60E+04	No
Alpha Chlordane	1	1	3.80E-02	3.80E-02	No	ND	--	No	1.00E+01	No	No	<Tier 1	1.00E+03	No
Aluminum	1	1	1.50E+03	1.50E+03	No	ND	--	No	3.60E+04	No	No	<Tier 1	3 60E+06	No
Arsenic	1	1	4.30E+03	4.30E+03	No	1 17E+01	Yes	No	2.00E+02	Yes	Yes	>Tier 1	2 00E+04	No
Barium	1	1	2.10E+01	2.10E+01	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Benzene	1	1	4.40E+01	4 40E+01	No	ND	--	No	2.50E+01	Yes	Yes	>Tier 1	2.50E+03	No
Calcium	1	1	5.30E+05	5 30E+05	Yes	4.27E+05	Yes	Yes	NA	--	No	EN	NA	--
Chlorobenzene	1	1	2 80E+00	2.80E+00	No	ND	--	No	5.00E+02	No	No	<Tier 1	5.00E+04	No
Chloroform	1	1	7.60E+01	7.60E+01	No	ND	--	No	1.00E-01	Yes	Yes	>Tier 1	1.00E+01	Yes
Cobalt	1	1	2 20E+02	2 20E+02	No	1.14E+01	Yes	No	1.00E+03	No	No	<Tier 1	1.00E+05	No
Copper	1	1	4.40E+01	4.40E+01	No	ND	--	No	6.50E+02	No	No	<Tier 1	6.50E+04	No
Dieldrin	1	1	2.90E-03	2.90E-03	No	ND	--	No	1.00E-01	No	No	<Tier 1	1.00E+01	No
Endrin ketone	1	1	9.40E-03	9.40E-03	No	5.21E-02	No	Yes	1.00E+01	No	No	<Tier 1	1.00E+03	No
Gamma Chlordane	1	1	1 00E-02	1.00E-02	No	ND	--	No	1.00E+01	No	No	<Tier 1	1.00E+03	No
gamma-BHC (Lindane)	1	1	1.10E-02	1.10E-02	No	1.01E-02	Yes	No	1.00E+00	No	No	<Tier 1	1.00E+02	No
Iron	1	1	2.90E+05	2.90E+05	Yes	2 20E+04	Yes	Yes	5.00E+03	Yes	No	EN	5.00E+05	No
Magnesium	1	1	1.60E+05	1.60E+05	Yes	9 23E+04	Yes	Yes	NA	--	No	EN	NA	--
Manganese	1	1	1.00E+04	1.00E+04	No	1.75E+03	Yes	No	1.00E+04	No	No	<Tier 1	1.00E+06	No
Methylene chloride	1	1	3.60E+00	3.60E+00	No	ND	--	No	5 00E+01	No	No	<Tier 1	5.00E+03	No
Naphthalene	1	1	2.80E+01	2 80E+01	No	ND	--	No	3.90E+01	No	No	<Tier 1	3.90E+03	No
Nickel	1	1	1.80E+05	1.80E+05	No	1.30E+02	Yes	No	2.00E+03	Yes	Yes	>Tier 1	2.00E+05	No
Pentachlorophenol	1	1	3 70E-01	3 70E-01	No	ND	--	No	5.00E+00	No	No	<Tier 1	5.00E+02	No
Potassium	1	1	2 90E+04	2 90E+04	Yes	1 23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	1	1	4.70E+04	4.70E+04	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Total TCDD-TEQ	1	1	3.16E-06	3.16E-06	No	5.02E-07	Yes	No	3 00E-05	No	No	<Tier 1	3.00E-03	No
Trichloroethene	1	1	1 60E+00	1.60E+00	No	ND	--	No	2 50E+01	No	No	<Tier 1	2.50E+03	No
Xylenes, Total	1	1	3.80E+00	3.80E+00	No	ND	--	No	1.00E+04	No	No	<Tier 1	1.00E+06	No
Zinc	1	1	1 20E+03	1.20E+03	No	ND	--	No	1 00E+04	No	No	<Tier 1	1.00E+06	No

H-29

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: L
Well: EEG-111

	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
Constituent	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
Aluminum	1	1	5.50E+03	5.50E+03	No	ND	--	No	3.60E+04	No	No	<Tier 1	3.60E+06	No
Arsenic	1	1	4.20E+00	4.20E+00	No	1.17E+01	No	Yes	2.00E+02	No	No	<Tier 1	2.00E+04	No
Barium	1	1	4.70E+02	4.70E+02	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Calcium	1	1	1.50E+05	1.50E+05	Yes	4.27E+05	No	Yes	NA	--	No	EN	NA	--
Chromium	1	1	1.80E+01	1.80E+01	No	1.05E+02	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Cobalt	1	1	9.30E+00	9.30E+00	No	1.14E+01	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Copper	1	1	9.40E+00	9.40E+00	No	ND	--	No	6.50E+02	No	No	<Tier 1	6.50E+04	No
delta-BHC	1	1	9.80E-03	9.80E-03	No	1.25E-02	No	Yes	1.50E-01	No	No	<Tier 1	1.50E+01	No
Iron	1	1	1.10E+04	1.10E+04	Yes	2.20E+04	No	Yes	5.00E+03	Yes	No	EN	5.00E+05	No
Magnesium	1	1	2.90E+04	2.90E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	1	1	4.00E+02	4.00E+02	No	1.75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Molybdenum	1	1	1.00E+01	1.00E+01	No	ND	--	No	1.80E+02	No	No	<Tier 1	1.80E+04	No
Nickel	1	1	2.40E+01	2.40E+01	No	1.30E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Pentachlorophenol	1	1	1.30E-01	1.30E-01	No	ND	--	No	5.00E+00	No	No	<Tier 1	5.00E+02	No
Potassium	1	1	5.80E+03	5.80E+03	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	1	1	2.80E+04	2.80E+04	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Vanadium	1	1	1.70E+01	1.70E+01	No	ND	--	No	4.90E+01	No	No	<Tier 1	4.90E+03	No
Zinc	1	1	3.70E+01	3.70E+01	No	ND	--	No	1.00E+04	No	No	<Tier 1	1.00E+06	No

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: L
Well AA-SW-S2

	Summary Statistics				COPC Selection - Chronic Exposure Screen									Short-Term Exposure Screen	
Constituent	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
Aluminum	2	1	1.37E+03	2 60E+03	No	ND	--	No	3.60E+04	No	No	<Tier 1	3.60E+06	No
Barium	2	2	2.05E+02	2.10E+02	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Calcium	2	2	1.30E+05	1 40E+05	Yes	4.27E+05	No	Yes	NA	--	No	EN	NA	--
Cobalt	2	1	6 15E+00	7.30E+00	No	1.14E+01	No	Yes	1.00E+03	No	No	<Tier 1	1 00E+05	No
Copper	1	1	2.30E+00	2.30E+00	No	ND	--	No	6.50E+02	No	No	<Tier 1	6.50E+04	No
Iron	2	2	3.83E+03	6.70E+03	Yes	2.20E+04	No	Yes	5.00E+03	Yes	No	EN	5 00E+05	No
Lead	2	1	2.55E+00	2.60E+00	No	ND	--	No	1.00E+02	No	No	<Tier 1	1.00E+04	No
Magnesium	2	2	3.20E+04	3.60E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	2	2	7.15E+02	1.30E+03	No	1.75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Molybdenum	2	2	3.50E+00	3.70E+00	No	ND	--	No	1 80E+02	No	No	<Tier 1	1.80E+04	No
Nickel	2	2	1.39E+01	1.90E+01	No	1.30E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Potassium	2	2	4.55E+03	5.60E+03	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	2	2	5 65E+03	6.50E+03	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Total PCBs	2	2	1.17E+00	1.18E+00	No	ND	--	No	2.50E+00	No	No	<Tier 1	2.50E+02	No
Total TCDD-TEQ	1	1	3.99E-06	3 99E-06	No	5.02E-07	Yes	No	3.00E-05	No	No	<Tier 1	3.00E-03	No
Vanadium	2	1	5.95E+00	6 90E+00	No	ND	--	No	4.90E+01	No	No	<Tier 1	4.90E+03	No

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: L
Well. AA-SW-S3

	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
Constituent	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
Aluminum	2	2	2.55E+03	4.40E+03	No	ND	--	No	3.60E+04	No	No	<Tier 1	3.60E+06	No
Arsenic	2	1	6.95E+00	8.90E+00	No	1.17E+01	No	Yes	2.00E+02	No	No	<Tier 1	2.00E+04	No
Barium	2	2	2.40E+02	2.90E+02	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Calcium	2	2	1.65E+05	1.80E+05	Yes	4.27E+05	No	Yes	NA	--	No	EN	NA	--
Cobalt	2	2	6.90E+00	8.50E+00	No	1.14E+01	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Copper	1	1	4.50E+00	4.50E+00	No	ND	--	No	6.50E+02	No	No	<Tier 1	6.50E+04	No
Di-n-butylphthalate	1	1	3.20E-01	3.20E-01	No	ND	--	No	3.50E+03	No	No	<Tier 1	3.50E+05	No
Iron	2	2	5.35E+03	8.70E+03	Yes	2.20E+04	No	Yes	5.00E+03	Yes	No	EN	5.00E+05	No
Lead	2	1	2.60E+00	2.70E+00	No	ND	--	No	1.00E+02	No	No	<Tier 1	1.00E+04	No
Magnesium	2	2	3.45E+04	4.20E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	2	2	1.18E+03	2.00E+03	No	1.75E+03	Yes	No	1.00E+04	No	No	<Tier 1	1.00E+06	No
Molybdenum	2	1	5.65E+00	6.30E+00	No	ND	--	No	1.80E+02	No	No	<Tier 1	1.80E+04	No
Nickel	2	2	1.80E+01	1.90E+01	No	1.30E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Potassium	2	2	6.85E+03	7.10E+03	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	2	2	7.25E+03	7.70E+03	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Total PCBs	2	2	1.17E+00	1.18E+00	No	ND	--	No	2.50E+00	No	No	<Tier 1	2.50E+02	No
Total TCDD-TEQ	1	1	6.05E-06	6.05E-06	No	5.02E-07	Yes	No	3.00E-05	No	No	<Tier 1	3.00E-03	No
Trichloroethene	1	1	3.40E-01	3.40E-01	No	ND	--	No	2.50E+01	No	No	<Tier 1	2.50E+03	No
Vanadium	2	1	9.50E+00	1.40E+01	No	ND	--	No	4.90E+01	No	No	<Tier 1	4.90E+03	No

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: RES
Well: SGW-S1

	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
Constituent	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
4,4'-DDD	1	1	4.00E-03	4.00E-03	No	ND	--	No	5.50E-01	No	No	<Tier 1	5.50E+01	No
alpha-BHC	1	1	2.10E-03	2.10E-03	No	ND	--	No	1.50E-01	No	No	<Tier 1	1.50E+01	No
Aluminum	2	2	2.35E+03	4.00E+03	No	ND	--	No	3.60E+04	No	No	<Tier 1	3.60E+06	No
Arsenic	2	2	2.85E+01	4.40E+01	No	1.17E+01	Yes	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Barium	2	2	3.95E+02	5.40E+02	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Calcium	2	2	1.05E+05	1.30E+05	Yes	4.27E+05	No	Yes	NA	--	No	EN	NA	--
Chromium	2	2	1.12E+01	1.80E+01	No	1.05E+02	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Cobalt	2	2	8.10E+00	1.20E+01	No	1.14E+01	Yes	No	1.00E+03	No	No	<Tier 1	1.00E+05	No
Copper	2	2	6.55E+00	1.10E+01	No	ND	--	No	6.50E+02	No	No	<Tier 1	6.50E+04	No
Dieldrin	1	1	3.20E-03	3.20E-03	No	ND	--	No	1.00E-01	No	No	<Tier 1	1.00E+01	No
gamma-BHC (Lindane)	2	2	3.80E-03	4.10E-03	No	1.01E-02	No	Yes	1.00E+00	No	No	<Tier 1	1.00E+02	No
Heptachlor epoxide	1	1	1.40E-03	1.40E-03	No	2.66E-02	No	Yes	1.00E+00	No	No	<Tier 1	1.00E+02	No
Iron	2	2	9.80E+03	1.20E+04	Yes	2.20E+04	No	Yes	5.00E+03	Yes	No	EN	5.00E+05	No
Lead	2	2	9.20E+00	1.50E+01	No	ND	--	No	1.00E+02	No	No	<Tier 1	1.00E+04	No
Magnesium	2	2	1.14E+04	1.40E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	2	2	1.28E+03	1.70E+03	No	1.75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Methoxychlor	1	1	5.40E-03	5.40E-03	No	ND	--	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Molybdenum	2	2	6.05E+00	9.20E+00	No	ND	--	No	1.80E+02	No	No	<Tier 1	1.80E+04	No
Nickel	2	2	1.85E+01	2.70E+01	No	1.30E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Potassium	2	2	1.12E+04	1.60E+04	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	2	2	1.40E+04	1.50E+04	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Vanadium	2	2	8.90E+00	1.40E+01	No	ND	--	No	4.90E+01	No	No	<Tier 1	4.90E+03	No
Zinc	2	2	3.15E+01	5.10E+01	No	ND	--	No	1.00E+04	No	No	<Tier 1	1.00E+06	No

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: RES
Well: SGW-S2

	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
Constituent	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
2,4-DB	2	1	4.55E-01	6.60E-01	No	ND	--	No	2.90E+02	No	No	<Tier 1	2.90E+04	No
4,4'-DDE	1	1	2.00E-03	2.00E-03	No	ND	--	No	2.00E-01	No	No	<Tier 1	2 00E+01	No
Aluminum	2	2	3 90E+03	4.60E+03	No	ND	--	No	3.60E+04	No	No	<Tier 1	3.60E+06	No
Arsenic	1	1	4.70E+00	4.70E+00	No	1.17E+01	No	Yes	2.00E+02	No	No	<Tier 1	2.00E+04	No
Barium	2	2	4 05E+02	4.30E+02	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
beta-BHC	1	1	2 00E-03	2.00E-03	No	ND	--	No	1.50E-01	No	No	<Tier 1	1.50E+01	No
Calcium	2	2	1.55E+05	1.70E+05	Yes	4 27E+05	No	Yes	NA	--	No	EN	NA	--
Chromium	2	2	1.01E+01	1.10E+01	No	1.05E+02	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Cobalt	2	2	8.60E+00	1 00E+01	No	1.14E+01	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Copper	2	2	5.30E+00	5.90E+00	No	ND	--	No	6.50E+02	No	No	<Tier 1	6.50E+04	No
Gamma Chlordane	1	1	1.20E-03	1.20E-03	No	ND	--	No	1.00E+01	No	No	<Tier 1	1.00E+03	No
gamma-BHC (Lindane)	1	1	1.70E-03	1.70E-03	No	1.01E-02	No	Yes	1.00E+00	No	No	<Tier 1	1.00E+02	No
Iron	2	2	7.55E+03	8.40E+03	Yes	2.20E+04	No	Yes	5.00E+03	Yes	No	EN	5.00E+05	No
Lead	2	2	4.60E+00	4.70E+00	No	ND	--	No	1.00E+02	No	No	<Tier 1	1.00E+04	No
Magnesium	2	2	2.70E+04	2.70E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	2	2	7.75E+02	1.20E+03	No	1.75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Molybdenum	2	1	5.85E+00	6.70E+00	No	ND	--	No	1.80E+02	No	No	<Tier 1	1.80E+04	No
Nickel	2	2	1.90E+01	2 20E+01	No	1.30E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Potassium	2	2	5 20E+03	5.60E+03	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	2	2	1.85E+04	1.90E+04	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Total TCDD-TEQ	2	2	1.36E-05	1.22E-05	No	5.02E-07	Yes	No	3.00E-05	No	No	<Tier 1	3.00E-03	No
Vanadium	2	2	1.25E+01	1.40E+01	No	ND	--	No	4.90E+01	No	No	<Tier 1	4.90E+03	No
Zinc	2	2	2 80E+01	3.00E+01	No	ND	--	No	1.00E+04	No	No	<Tier 1	1.00E+06	No

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: RES
Well: DW-MCDO

Constituent	Summary Statistics				COPC Selection - Chronic Exposure Screen									Short-Term Exposure Screen	
	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
Arsenic	1	1	2.90E+01	2.90E+01	No	1.17E+01	Yes	No	2.00E+02	No	No	<Tier 1	2.00E+04	No
Barium	1	1	2.65E+02	2.65E+02	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Calcium	1	1	1.00E+05	1.00E+05	Yes	4.27E+05	No	Yes	NA	--	No	EN	NA	--
Carbon disulfide	1	1	7.25E+00	7.25E+00	No	8.50E+00	No	Yes	3.50E+03	No	No	<Tier 1	3.50E+05	No
Copper	1	1	1.85E+01	1.85E+01	No	ND	--	No	6.50E+02	No	No	<Tier 1	6.50E+04	No
delta-BHC	*1*	*1*	*2.90E-03*	*2.90E-03*	*No*	*1.25E-02*	*No*	*Yes*	*1.50E-01*	*No*	*No*	*<Tier 1*	*1.50E+01*	*No*
Fluoranthene	1	1	3.85E-01	3.85E-01	No	ND	--	No	1.40E+03	No	No	<Tier 1	1.40E+05	No
Iron	1	1	1.01E+04	1.01E+04	Yes	2.20E+04	No	Yes	5.00E+03	Yes	No	EN	5.00E+05	No
Lead	1	1	1.29E+02	1.29E+02	No	ND	--	No	1.00E+02	Yes	Yes	>Tier 1	1.00E+04	No
Magnesium	1	1	2.20E+04	2.20E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	1	1	5.75E+02	5.75E+02	No	1.75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Phenanthrene	1	1	3.80E-01	3.80E-01	No	ND	--	No	1.05E+04	No	No	<Tier 1	1.05E+06	No
Potassium	1	1	4.05E+03	4.05E+03	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	1	1	9.55E+03	9.55E+03	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Toluene	1	1	6.35E-01	6.35E-01	No	ND	--	No	2.50E+03	No	No	<Tier 1	2.50E+05	No
Total TCDD-TEQ	1	1	3.45E-06	3.45E-06	No	5.02E-07	Yes	No	3.00E-05	No	No	<Tier 1	3.00E-03	No
Vanadium	1	1	2.50E+00	2.50E+00	No	ND	--	No	4.90E+01	No	No	<Tier 1	4.90E+03	No
Zinc	1	1	4.05E+03	4.05E+03	No	ND	--	No	1.00E+04	No	No	<Tier 1	1.00E+06	No

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: RES
Well: DW-SCHM

	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
Constituent	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
Arsenic	1	1	6.40E+00	6.40E+00	No	1.17E+01	No	Yes	2.00E+02	No	No	<Tier 1	2.00E+04	No
Barium	1	1	2 20E+02	2.20E+02	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Calcium	1	1	1.70E+05	1.70E+05	Yes	4.27E+05	No	Yes	NA	--	No	EN	NA	--
Copper	1	1	2 80E+00	2.80E+00	No	ND	--	No	6.50E+02	No	No	<Tier 1	6 50E+04	No
Iron	1	1	1.70E+04	1.70E+04	Yes	2.20E+04	No	Yes	5.00E+03	Yes	No	EN	5.00E+05	No
Magnesium	1	1	3 90E+04	3.90E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	1	1	1.20E+03	1.20E+03	No	1.75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Potassium	1	1	6.80E+03	6.80E+03	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	1	1	2 20E+04	2.20E+04	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Total TCDD-TEQ	1	1	2.05E-06	2.05E-06	No	5.02E-07	Yes	No	3.00E-05	No	No	<Tier 1	3.00E-03	No
Zinc	1	1	1.20E+02	1.20E+02	No	ND	--	No	1.00E+04	No	No	<Tier 1	1.00E+06	No

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: RES
Well: DW-SETT

	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
Constituent	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
Barium	1	1	1.80E+02	1.80E+02	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Calcium	1	1	1.80E+05	1.80E+05	Yes	4.27E+05	No	Yes	NA	--	No	EN	NA	--
Carbon disulfide	1	1	1.50E+00	1.50E+00	No	6.50E+00	No	Yes	3.50E+03	No	No	<Tier 1	3.50E+05	No
Cobalt	1	1	3.00E+00	3.00E+00	No	1.14E+01	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Copper	1	1	2.60E+00	2.60E+00	No	ND	--	No	6.50E+02	No	No	<Tier 1	6.50E+04	No
Iron	1	1	2.40E+03	2.40E+03	Yes	2.20E+04	No	Yes	5.00E+03	No	No	EN	5.00E+05	No
Lead	1	1	2.70E+00	2.70E+00	No	ND	--	No	1.00E+02	No	No	<Tier 1	1.00E+04	No
Magnesium	1	1	4.10E+04	4.10E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	1	1	8.60E+02	8.60E+02	No	1.75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Nickel	1	1	6.20E+00	6.20E+00	No	1.30E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Potassium	1	1	5.70E+03	5.70E+03	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	1	1	2.40E+04	2.40E+04	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Zinc	1	1	7.50E+01	7.50E+01	No	ND	--	No	1.00E+04	No	No	<Tier 1	1.00E+06	No

H-37

Table
Comparison of Groundwater Data to TACO Tier I Screening Criteria
Area: RES
Well. DW-WRIG

	Summary Statistics				COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
Constituent	Number of Samples	Number of Detects	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is Max> BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
Barium	1	1	1.30E+02	1.30E+02	No	6.17E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Cadmium	1	1	1.00E+00	1.00E+00	No	ND	--	No	5.00E+01	No	No	<Tier 1	5.00E+03	No
Calcium	1	1	1.50E+05	1.50E+05	Yes	4.27E+05	No	Yes	NA	--	No	EN	NA	--
Cobalt	1	1	4.10E+00	4.10E+00	No	1.14E+01	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Copper	1	1	1.10E+00	1.10E+00	No	ND	--	No	6.50E+02	No	No	<Tier 1	6.50E+04	No
delta-BHC	1	1	4.00E-03	4.00E-03	No	1.25E-02	No	Yes	1.50E-01	No	No	<Tier 1	1.50E+01	No
Fluoranthene	1	1	3.60E-01	3.60E-01	No	ND	--	No	1.40E+03	No	No	<Tier 1	1.40E+05	No
Iron	1	1	1.90E+03	1.90E+03	Yes	2.20E+04	No	Yes	5.00E+03	No	No	EN	5.00E+05	No
Lead	1	1	1.50E+01	1.50E+01	No	ND	--	No	1.00E+02	No	No	<Tier 1	1.00E+04	No
Magnesium	1	1	3.80E+04	3.80E+04	Yes	9.23E+04	No	Yes	NA	--	No	EN	NA	--
Manganese	1	1	1.10E+03	1.10E+03	No	1.75E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Nickel	1	1	5.30E+01	5.30E+01	No	1.30E+02	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Potassium	1	1	5.70E+03	5.70E+03	Yes	1.23E+05	No	Yes	NA	--	No	EN	NA	--
Sodium	1	1	2.90E+04	2.90E+04	Yes	1.30E+05	No	Yes	NA	--	No	EN	NA	--
Total TCDD-TEQ	1	1	2.58E-06	2.58E-06	No	5.02E-07	Yes	No	3.00E-05	No	No	<Tier 1	3.00E-03	No
Zinc	1	1	9.50E+02	9.50E+02	No	ND	--	No	1.00E+04	No	No	<Tier 1	1.00E+06	No

APPENDIX I

COPC SELECTION FOR SURFACE WATER AND FISH TISSUE

APPENDIX I
COPC SELECTION FOR SURFACE WATER AND FISH TISSUE

This appendix presents the screening tables for identifying COPCs for surface water and fish tissue.

Surface Water

COPCs are identified for surface water using the "Groundwater and Surface Water Standards" presented in Appendix C Table C-4. The screening Table I-1 presents:

- The frequency of detection and the arithmetic mean and maximum detected concentrations;
- An identification of essential nutrient status and comparison to background, as presented in Appendix D;
- Comparison to the TACO Tier 1 screening values; and
- An identification of whether or not a constituent is selected as a COPC and the reason why or why not.

The information in the last column of the table pertains to the short-term risk assessment, and will be discussed in Section 7.0 of the text.

The screening results are summarized in Section 3.3.4 of the text.

Fish Tissue

COPCs are identified for fish tissue using the "Fish Tissue Standards" presented in Appendix C Table C-6. Table I-2 presents the background calculation for fish tissue based on four composite fish tissue samples collected from two reference areas. The COPC selection for fish tissue was conducted on a sample-by-sample basis. The screening Table I-3 presents:

- The fish tissue concentration;
- Comparison to background;
- Comparison to the USEPA Region 3 Risk-Based Concentrations for fish tissue; and
- An identification of whether or not a constituent is selected as a COPC and the reason why or why not.

The screening results are summarized in Section 3.3.5 of the text.

TABLE I-1
COMPARISON OF SURFACE WATER DATA TO TACO TIER I STANDARDS
CREEK SEGMENT F AND BORROW PIT LAKE
SAUGET AREA 1 EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

I-3

	Summary Statistics					COPC Selection - Chronic Exposure Screen								Short-Term Exposure Screen	
Constituent	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Average (ug/L)	Maximum (MAX) Detection (ug/L)	Is Constituent an Essential Nutrient (EN)?	Background (BK) Concentration (ug/L)	Is MAX>BK?	Pass EN/BK?	TACO Class II Groundwater Criteria (ug/L)	Is Max> Class II?	COPC?	Reason	100 Times TACO Class II Groundwater Criteria (ug/L)	Is Average> 100*Class II?
Total 2,3,6,7-TCDD TEQ	6	6	100%	2.68E-06	9.01E-06	No	2.67E-05	No	Yes	3.00E-05	No	No	<Tier 1	3 00E-03	No
Acetone	6	3	50%	1.50E+01	1.80E+01	No	5.03E+01	No	Yes	7.00E+02	No	No	<Tier 1	7.00E+04	No
alpha-BHC	6	2	33%	7.35E-04	1.00E-03	No	3 10E-03	No	Yes	1.50E-01	No	No	<Tier 1	1.50E+01	No
Aluminum	6	6	100%	9.17E+02	3.40E+03	No	2.65E+04	No	Yes	3.60E+04	No	No	<Tier 1	3.60E+06	No
Arsenic	6	5	83%	8.00E+00	1.50E+01	No	2.92E+01	No	Yes	2.00E+02	No	No	<Tier 1	2.00E+04	No
Barium	6	6	100%	1.44E+02	3.20E+02	No	7.18E+02	No	Yes	2.00E+03	No	No	<Tier 1	2 00E+05	No
Benzene	6	1	17%	7.83E-01	1.70E+00	No	ND	--	No	2.50E+01	No	No	<Tier 1	2.50E+03	No
beta-BHC	6	3	50%	1.04E-02	2.00E-02	No	2.15E-02	No	Yes	1.50E-01	No	No	<Tier 1	1.50E+01	No
Calcium	6	6	100%	5.82E+04	8.90E+04	Yes	1.17E+05	No	Yes	NA	No	No	EN	NA	--
Chromium	6	1	17%	4.10E+00	4.10E+00	No	3.08E+01	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Cobalt	6	1	17%	1.50E+00	1.50E+00	No	1.14E+01	No	Yes	1.00E+03	No	No	<Tier 1	1.00E+05	No
Copper	6	6	100%	5.23E+00	1.20E+01	No	2.46E+01	No	Yes	6.50E+02	No	No	<Tier 1	6.50E+04	No
delta-BHC	6	2	33%	1.17E-03	2.20E-03	No	1.25E-02	No	Yes	1.50E-01	No	No	<Tier 1	1.50E+01	No
Dieldrin	6	1	17%	1.00E-03	1.00E-03	No	5.70E-03	No	Yes	1.00E-01	No	No	<Tier 1	1.00E+01	No
Endosulfan I	6	2	33%	1.95E-03	2.40E-03	No	1.40E-02	No	Yes	2.10E+02	No	No	<Tier 1	2.10E+04	No
Endosulfan sulfate	6	1	17%	3.20E-03	3.20E-03	No	9 27E-03	No	Yes	2.10E+02	No	No	<Tier 1	2.10E+04	No
Endrin	6	1	17%	9.50E-04	9.50E-04	No	5.88E-03	No	Yes	1.00E+01	No	No	<Tier 1	1 00E+03	No
Endrin aldehyde	6	2	33%	2.40E-03	3.20E-03	No	5.23E-02	No	Yes	1.00E+01	No	No	<Tier 1	1 00E+03	No
Endrin ketone	6	1	17%	2.70E-03	2.70E-03	No	1.57E-02	No	Yes	1.00E+01	No	No	<Tier 1	1 00E+03	No
Fluoranthene	6	1	17%	7.00E-01	7 00E-01	No	ND	--	No	1.40E+03	No	No	<Tier 1	1.40E+05	No
gamma-BHC (Lindane)	6	2	33%	3.10E-03	3 80E-03	No	1.05E-02	No	Yes	1 00E+00	No	No	<Tier 1	1 00E+02	No
Heptachlor	6	3	50%	2.57E-03	2.90E-03	No	7.00E-03	No	Yes	2.00E+00	No	No	<Tier 1	2.00E+02	No
Heptachlor epoxide	6	2	33%	9.30E-04	9 60E-04	No	1.19E-02	No	Yes	1.00E+00	No	No	<Tier 1	1 00E+02	No
Iron	6	6	100%	2 28E+03	8.70E+03	Yes	3.28E+04	No	Yes	5.00E+03	Yes	No	EN	5.00E+05	No
Lead	6	5	83%	5.55E+00	2.00E+01	No	5.15E+01	No	Yes	1.00E+02	No	No	<Tier 1	1.00E+04	No
Magnesium	6	6	100%	3.05E+04	3.30E+04	Yes	5.35E+04	No	Yes	NA	No	No	EN	NA	--
Manganese	6	6	100%	3.87E+02	1.70E+03	No	3 95E+03	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No
Molybdenum	6	3	50%	3.43E+00	4.00E+00	No	1 07E+01	No	Yes	1.80E+02	No	No	<Tier 1	1 80E+04	No
Nickel	6	6	100%	1.26E+01	2.10E+01	No	3.48E+01	No	Yes	2.00E+03	No	No	<Tier 1	2.00E+05	No
Phenanthrene	6	1	17%	7.00E-01	7.00E-01	No	ND	--	No	1.05E+04	No	No	<Tier 1	1.05E+06	No
Potassium	6	6	100%	6.58E+03	7.60E+03	Yes	1.70E+04	No	Yes	NA	No	No	EN	NA	--
Sodium	6	6	100%	2.18E+04	2.40E+04	Yes	3.80E+04	No	Yes	NA	No	No	EN	NA	--
Vanadium	6	4	67%	7.18E+00	1.40E+01	No	8.48E+01	No	Yes	4.90E+01	No	No	<Tier 1	4 90E+03	No
Zinc	6	6	100%	3 49E+01	7.50E+01	No	1.52E+02	No	Yes	1.00E+04	No	No	<Tier 1	1.00E+06	No

TABLE I-2
FISH FILLET - BACKGROUND
SAUGET AREA 1 EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	White Crapple Reference Samples (mg/kg)								White Crapple Background Concentrations (mg/kg) (a)
	WC REF1 COMP 1		WC REF1 COMP 2		WC REF2 COMP 1		WC REF2 COMP 2		
4,4'-DDE	1.20E-03		8.00E-04		--	(c)	--	(c)	2.00E-03
bis(2-Ethylhexyl)phthalate	8.40E-02		1.00E-01		9.50E-02		1.40E-01		2.10E-01
Chromium	2.10E-01	(b)	2.10E-01		2.50E-01	(b)	2.25E-01	(b)	4.48E-01
Copper	3.20E-01		2.30E-01		--	(c)	2.10E-01		5.07E-01
Heptachlor	1.30E-03		1.10E-03		1.80E-03		7.00E-04	(b)	2.45E-03
Mercury	3.70E-02		5.20E-02		5.20E-02		4.10E-02		9.10E-02
Pentachlorophenol	--	(c)	--	(c)	3.80E-03		--	(c)	7.60E-03
Selenium	2.10E-01	(b)	2.25E-01	(b)	7.30E-01		2.25E-01	(b)	6.95E-01
Total 2,3,7,8-TCDD TEQ	6.50E-07		1.34E-06		8.12E-07		5.36E-07		1.67E-06
Zinc	7.10E+00		7.00E+00		6.40E+00		5.40E+00		1.30E+01

Notes:
(a) - Background as defined in the Human Health Risk Assessment Workplan for Sauget Area 1 is two times the average concentration in the background or reference samples.
(b) - One-half the detection limit.
(c) - One-half the detection limit is greater than the maximum detected concentration and therefore is not used in the calculation (U.S.EPA, 1989).

TABLE I-3
COMPARISON OF FISH FILLET DATA TO REGION III RBCS FOR FISH TISSUE
SAUGET AREA 1 EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Sample Number (e,f)	Constituent	Concentration (mg/kg)	Qualifier	Background (mg/kg)	Is Concentration > Background?	RBC (a) (mg/kg)	Is Concentration > RBC?	COPC?	Reason
WB BP FILLET 2	4,4'-DDE	9.20E-03	J	ND	--	9.28E-03	No	No	<RBC
	Gamma Chlordane	4.70E-03	J	ND	--	9.01E-03 (d)	No	No	<RBC
WC BP COMP 1	Arsenic	4.50E-01	J	ND	--	2.10E-03	Yes	Yes	>RBC
	Copper	2.50E-01	J	5.07E-01	No	5.41E+01	No	No	<BK/RBC
	Di-n-butylphthalate	2.70E-02	J	ND	--	1.35E+02	No	No	<RBC
	Total 2,3,7,8-TCDD TEQ	2.40E-05		1.67E-06	Yes	2.50E-05 (g)	No	No	<RBC
	Zinc	7.90E+00	J	1.30E+01	No	4.06E+02	No	No	<BK/RBC
WC BP COMP 2	bis(2-Ethylhexyl)phthalate	1.30E-01	J	2.10E-01	No	2.25E-01	No	No	<BK/RBC
	Chromium	2.20E-01	J	4.48E-01	No	2.03E+03 (b)	No	No	<BK/RBC
	Copper	5.70E-01	J	5.07E-01	Yes	5.41E+01	No	No	<RBC
	Total 2,3,7,8-TCDD TEQ	9.52E-07		1.67E-06	No	2.50E-05 (g)	No	No	<BK/RBC
	Zinc	7.10E+00	J	1.30E+01	No	4.06E+02	No	No	<BK/RBC
WC BP COMP 3	Total 2,3,7,8-TCDD TEQ	6.93E-07		1.67E-06	No	2.50E-05 (g)	No	No	<BK/RBC
	bis(2-Ethylhexyl)phthalate	1.00E-01	J	2.10E-01	No	2.25E-01	No	No	<BK/RBC
	Mercury	2.70E-02	J	9.10E-02	No	1.35E-01 (c)	No	No	<BK/RBC
	Zinc	9.20E+00	J	1.30E+01	No	4.06E+02	No	No	<BK/RBC

Notes:
COPC - Constituent of Potential Concern.
RBC - Risk-Based Concentration.
WB - White Bass (There was insufficient white crappie sample to submit for all constituent analyses; therefore, white bass fillet samples were submitted for pesticide (8151A) and herbicide (8081A) analyses only.)
WC - White Crappie.
(a) - USEPA Region III Risk-Based Concentration (RBC) Table, October 5, 2000. Value for fish tissue.
(b) - Value for Chromium III.
(c) - Value for Methyl Mercury.
(d) - Value for Chlordane.
(e) - Sample "WB BP Fillet 1" was non-detect for all constituents.
(f) - All samples were collected from Borrow Pit Lake.

APPENDIX J

EVALUATION OF AMBIENT AIR MONITORING DATA

APPENDIX J
EVALUATION OF AMBIENT AIR MONITORING DATA

This appendix presents the upwind and downwind ambient air monitoring data collected at Fill Areas G, H, I and L to determine the tendency of site constituents to enter the atmosphere and local wind patterns. At Fill Area G, air samples were collected at two upwind and two downwind locations. At Fill Areas H, I, and L, air samples were collected at one upwind and two downwind locations. Figure 3-7 identifies the ambient air sampling locations.

Air samples were analyzed for VOCs, SVOCs, PCBs, dioxins, and metals. Table J-1 presents the upwind or background air concentrations for each fill area. Tables J-2 through J-5 present the comparison of each downwind sample concentration to upwind concentrations and to the PRGs for ambient air (USEPA, 1999a) for Fill Areas G, H, I, and L, respectively. Comparisons are made on a sample-by-sample basis.

The results of the screening are discussed in Section 3.3.6 of the report. The short-term screen presented in Table J-6 is discussed in Section 7.0 of the report.

TABLE J-1
UPWIND (BACKGROUND) AIR CONCENTRATIONS
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Fill Area	G			H	I	L
Location	UP#1	UP#2		UP#1	UP#1	UP#1
Sample (a)	AIR-V-9	AIR-V-10	Maximum	AIR-V-6	AIR-V-3	AIR-V-13
Constituent	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	32.5733	ND	ND
2-Butanone	ND	ND	ND	ND	24.0175	ND
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	283.8428	ND
Ethylbenzene	2.7926	1.7878	2.7926	ND	ND	1.3086
Isopropylbenzene	ND	1.6687	1.6687	ND	1.4192	ND
m&p-Xylene	4.2553	2.503	4.2553	ND	1.4192	1.3086
Methylene chloride	152.9255	ND	152.9255	ND	300.2183	ND
n-Butylbenzene	ND	ND	ND	ND	ND	ND
o-Xylene	3.4575	2.1454	3.4575	ND	ND	1.3086
p-Isopropyltoluene	ND	ND	ND	ND	ND	ND
s-Butylbenzene	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND
t-Butylbenzene	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	ND	ND	ND	4.8035	ND

Notes:
(a) - Sum of tube 1 and tube 2. One-half the detection limit was used for constituents reported as "Not Detected" if constituent was detected in one tube and not the other. If one-half the detection limit was greater than the detected concentration for a constituent, that detection limit was not used, in accordance with Risk Assessment Guidance for Superfund. (USEPA, 1989).

TABLE J-2
FILL AREA G DOWNWIND AIR CONCENTRATIONS
COMPARISON TO BACKGROUND AND SCREENING CRITERIA
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Location Sample (a) / Constituent	Comparison Values: Maximum Upwind ug/m3	Comparison Values: PRG (b) ug/m3	Downwind Location #1 (DW#1) Screen: DW#1 AIR-V-7 ug/m3	Is DW #1 Conc> Upwind?	Is DW #1 Conc> PRG?	DW #1 COPC?	Downwind Location #2 (DW#2) Screen: DW#2 AIR-V-8 ug/m3	Is DW #2 Conc> Upwind?	Is DW #2 Conc> PRG?	DW #2 COPC?	Waste Area G COPC?
2-Butanone	ND	1000	16.81	ND	No	No, <PRG	ND	ND	ND	No, ND	No
4-Methyl-2-pentanone	ND	83	106.19	ND	Yes	Yes, >PRG/BK	ND	ND	ND	No, ND	Yes
Acetone	ND	370	761.06	ND	Yes	Yes, >PRG/BK	ND	ND	ND	No, ND	Yes
Ethylbenzene	2.79	1100	17.70	Yes	No	No, <PRG	1.45	No	No	No, <PRG/BK	No
Isopropylbenzene	1.67	400	22.12	Yes	No	No, <PRG	ND	ND	ND	No, ND	No
m&p-Xylene	4.26	730	19.47	Yes	No	No, <PRG	3.02	No	No	No, <PRG/BK	No
Methylene chloride	152.93	4.1	72.57	No	Yes	No, <BK	2424.43	Yes	Yes	Yes, >PRG/BK	Yes
n-Butylbenzene	ND	36.5	ND	ND	ND	No, ND	1.45	ND	No	No, <PRG	No
o-Xylene	3.46	730	17.70	Yes	No	No, <PRG	2.90	No	No	No, <PRG/BK	No
p-Isopropyltoluene	ND	730	8.85	ND	No	No, <PRG	ND	ND	ND	No, ND	No
Styrene	ND	1100	20.35	ND	No	No, <PRG	ND	ND	ND	No, ND	No
t-Butylbenzene	ND	36.5	9.38	ND	No	No, <PRG	ND	ND	ND	No, ND	No
Tetrachloroethene	ND	3.3	2.92	ND	No	No, <PRG	ND	ND	ND	No, ND	No
Toluene	ND	400	166.81	ND	No	No, <PRG	ND	ND	ND	No, ND	No

Notes:
COPC - Constituent of Potential Concern.
ND - Not Detected.
PRG - USEPA Region IX Preliminary Remediation Goal Table, October 1, 1999. See Table x for full references.
(a) - Sum of tube 1 and tube 2. One-half the detection limit was used for constituents reported as "Not Detected" if constituent was detected in one tube and not the other. If one-half the detection limit was greater than the detected concentration for a constituent, that detection limit was not used, in accordance with Risk Assessment Guidance for Superfund. (USEPA, 1989).
(b) - See Appendix C Table C-5 for references.

TABLE J-3
FILL AREA H DOWNWIND AIR CONCENTRATIONS
COMPARISON TO BACKGROUND AND SCREENING CRITERIA
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Location Sample (a) Constituent	Comparison Values		Downwind Location #1 (DW#1) Screen				Downwind Location #2 (DW#2) Screen				Waste Area H COPC?
	Maximum Upwind ug/m3	PRG (b) ug/m3	DW#1 AIR-V-5 ug/m3	Is DW #1 Conc> Upwind?	Is DW #1 Conc> PRG?	DW #1 COPC?	DW#2 AIR-V-4 ug/m3	Is DW #2 Conc> Upwind?	Is DW #2 Conc> PRG?	DW #2 COPC?	
1,1,1-Trichloroethane	ND	1000	11.87	ND	No	No, <PRG	ND	ND	ND	No, ND	No
1,1-Dichloroethene	32.57	0.038	27.47	No	Yes	No, <BK	ND	ND	ND	No, ND	No
2-Butanone	ND	1000	ND	ND	ND	No, ND	24.68	ND	No	No, <PRG	No
Acetone	ND	370	ND	ND	ND	No, ND	24.03	ND	No	No, <PRG	No
Ethylbenzene	ND	1100	ND	ND	ND	No, ND	1.82	ND	No	No, <PRG	No
Isopropylbenzene	ND	400	ND	ND	ND	No, ND	2.34	ND	No	No, <PRG	No
m&p-Xylene	ND	730	ND	ND	ND	No, ND	2.21	ND	No	No, <PRG	No
Methylene chloride	ND	4.1	ND	ND	ND	No, ND	14.29	ND	Yes	Yes, >PRG/BK	Yes
o-Xylene	ND	730	ND	ND	ND	No, ND	2.73	ND	No	No, <PRG	No
s-Butylbenzene	ND	36.5	ND	ND	ND	No, ND	2.21	ND	No	No, <PRG	No
t-Butylbenzene	ND	36.5	ND	ND	ND	No, ND	0.71	ND	No	No, <PRG	No
Tetrachloroethene	ND	3.3	ND	ND	ND	No, ND	0.91	ND	No	No, <PRG	No
Trichloroethene	ND	1.1	ND	ND	ND	No, ND	6.69	ND	Yes	Yes, >PRG/BK	Yes

Notes:
COPC - Constituent of Potential Concern.
ND - Not Detected.
PRG - USEPA Region IX Preliminary Remediation Goal Table, October 1, 1999. See Table x for full references.
(a) - Sum of tube 1 and tube 2. One-half the detection limit was used for constituents reported as "Not Detected" if constituent was detected in one tube and not the other. If one-half the detection limit was greater than the detected concentration for a constituent, that detection limit was not used, in accordance with Risk Assessment Guidance for Superfund. (USEPA, 1989).
(b) - See Appendix C Table C-5 for references.

TABLE J-4
FILL AREA I DOWNWIND AIR CONCENTRATIONS
COMPARISON TO BACKGROUND AND SCREENING CRITERIA
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Comparison Values		Downwind Location #1 (DW#1) Screen				Downwind Location #2 (DW#2) Screen				
Location Sample (a) Constituent	Maximum Upwind ug/m3	PRG (b) ug/m3	DW#1 AIR-V-2 ug/m3	Is DW #1 Conc> Upwind?	Is DW #1 Conc> PRG?	DW #1 COPC?	DW#2 AIR-V-1 ug/m3	Is DW #2 Conc> Upwind?	Is DW #2 Conc> PRG?	DW #2 COPC?	Waste Area I COPC?
Ethylbenzene	ND	1100	ND	ND	ND	No, ND	1.69	ND	No	No, <PRG	No
Methylene chloride	300.22	4.1	2100.15	Yes	Yes	Yes, >PRG/BK	18.87	No	Yes	No, <BK	Yes

Notes:
COPC - Constituent of Potential Concern.
ND - Not Detected.
PRG - USEPA Region IX Preliminary Remediation Goal Table, October 1, 1999. See Table x for full references.
(a) - Sum of tube 1 and tube 2. One-half the detection limit was used for constituents reported as "Not Detected" if constituent was detected in one tube and not the other. If one-half the detection limit was greater than the detected concentration for a constituent, that detection limit was not used, in accordance with Risk Assessment Guidance for Superfund. (USEPA, 1989).
(b) - See Appendix C Table C-5 for references.

J-6

TABLE J-5
FILL AREA L DOWNWIND AIR CONCENTRATIONS
COMPARISON TO BACKGROUND AND SCREENING CRITERIA
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Location Sample (a) / Constituent	Comparison Values		Downwind Location #1 (DW#1) Screen				Downwind Location #2 (DW#2) Screen				
	Maximum Upwind ug/m3	PRG (b) ug/m3	DW#1 AIR-V-11 ug/m3	Is DW #1 Conc> Upwind?	Is DW #1 Conc> PRG?	DW #1 COPC?	DW#2 AIR-V-12 ug/m3	Is DW #2 Conc> Upwind?	Is DW #2 Conc> PRG?	DW #2 COPC?	Waste Area L COPC?
2-Butanone	ND	1000	ND	ND	ND	No, ND	30.53	ND	No	No, <PRG	No
m&p-Xylene	1.31	730	0.58	No	No	No, <PRG/BK	ND	ND	ND	No, ND	No
Methylene chloride	ND	4.1	893.84	ND	Yes	Yes, >PRG	ND	ND	ND	No, ND	Yes
o-Xylene	1.31	730	ND	ND	ND	No, ND	1.83	Yes	No	No, <PRG	No

Notes:
COPC - Constituent of Potential Concern.
ND - Not Detected.
PRG - USEPA Region IX Preliminary Remediation Goal Table, October 1, 1999. See Table x for full references.
(a) - Sum of tube 1 and tube 2. One-half the detection limit was used for constituents reported as "Not Detected" if constituent was detected in one tube and not the other. If one-half the detection limit was greater than the detected concentration for a constituent, that detection limit was not used, in accordance with Risk Assessment Guidance for Superfund. (USEPA, 1989).
(b) - See Appendix C Table C-5 for references.

J-7

TABLE J-6
FILL AREA AVERAGE DOWNWIND AIR CONCENTRATIONS
SHORT-TERM EXPOSURE EVALUATION
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

		G		H		I		L	
Constituent	**100 Times PRG (a)**	**Avg (ug/m3)**	**Is Avg>100 PRG?**	**Avg (ug/m3)**	**Is Avg>100 PRG?**	**Avg (ug/m3)**	**Is Avg>100 PRG?**	**Avg (ug/m3)**	**Is Avg>100 PRG?**
1,1,1-Trichloroethane	100000	ND	--	5.93	No	ND	--	ND	--
1,1-Dichloroethene	3.8	ND	--	13.74	Yes	ND	--	ND	--
2-Butanone	100000	16.81	No	24.68	No	ND	--	30.53	No
4-Methyl-2-pentanone	8300	53.10	No	ND	--	ND	--	ND	--
Acetone	37000	380.53	No	24.03	No	ND	--	ND	--
Ethylbenzene	110000	6.38	No	1.82	No	1.69	No	ND	--
Isopropylbenzene	40000	11.06	No	2.34	No	ND	--	ND	--
m&p-Xylene	73000	5.62	No	2.21	No	ND	--	0.58	No
Methylene chloride	410	624.25	Yes	7.14	No	529.75	Yes	446.92	Yes
n-Butylbenzene	3650	1.45	No	ND	--	ND	--	ND	--
o-Xylene	73000	5.15	No	2.73	No	ND	--	1.83	No
p-Isopropyltoluene	73000	4.42	No	ND	--	ND	--	ND	--
s-Butylbenzene	3650	ND	--	2.21	No	ND	--	ND	--
Styrene	110000	10.18	No	ND	--	ND	--	ND	--
t-Butylbenzene	3650	4.69	No	0.71	No	ND	--	ND	--
Tetrachloroethene	330	2.92	No	0.91	No	ND	--	ND	--
Toluene	40000	83.41	No	ND	--	ND	--	ND	--
Trichloroethene	110	ND	--	3.34	No	ND	--	ND	--

Notes:
ND - Not Detected.
PRG - USEPA Region IX Preliminary Remediation Goal Table, October 1, 1999. See Appendix C Table C-5 for full references.
(a) - See Appendix C Table C-5 for references.

APPENDIX K

CALCULATION OF INDOOR AIR VOC CONCENTRATIONS FROM GROUNDWATER

APPENDIX K
CALCULATION OF INDOOR AIR VOC CONCENTRATIONS FROM GROUNDWATER

For the groundwater-to-indoor air pathway, indoor air exposure point concentrations were predicted using the Johnson and Ettinger model (1991). The Johnson and Ettinger model considers both diffusion of compounds migrating from the subsurface and convection, which is driven by the pressure difference between the subsurface and the building. Equations and parameters required for the implementation of this model are provided in Johnson and Ettinger (1991) and in *User's Guide for the Johnson and Ettinger (1991) Model* (US EPA, 1997). The spreadsheet "GWSCREEN.XLS", available from the USEPA for implementation of the Johnson and Ettinger (1991) model was used in this risk assessment.

With the exceptions discussed below, parameters used in the model were the default parameters provided by USEPA (USEPA, 1997). Major assumptions used in modeling indoor air for the site are listed below:

- Of the 12 Soil Conservation Service (SCS) soil classifications available for use in the USEPA spreadsheet, silt loam was selected as most representative of site conditions.
- Depth below grade to bottom of enclosed space floor was selected to be 15 cm.
- The IEPA (1998) default for soil dry bulk density of 1.5 g/cm^3 was used.
- Depth below grade to water table varies from 14.5 ft below ground surface (bgs) to 17.7 ft bgs across the four fill areas of interest in this risk assessment (Fill Areas G, H, I, and L).

Modeling assumptions, inputs, and results are presented in the attached modeling printouts.

The modeling printouts are presented in the following order (identifiers for each run of the model are presented in the lower right hand corner of each page):

<u>RME INDOOR AIR CONCENTRATIONS</u>

- Fill Area G, EE-05:
  - Benzene
  - Chlorobenzene
  - Naphthalene
- Fill Area G, EEG-107:
  - 4-Methyl-2-pentanone
  - Benzene
  - Chlorobenzene
  - Naphthalene

Tetrachloroethene
Toluene
Trichloroethene
Vinyl Chloride

- Fill Area H, EE-01:
  1,1,2,2-Tetrachloroethene
  Benzene
  Chlorobenzene
  Ethylbenzene
  Naphthalene

- Fill Area H, EE-02:
  Benzene
  Chlorobenzene
  Chloroform
  Naphthalene
  Trichloroethene

- Fill Area I, AA-I-S1:
  Benzene
  Chlorobenzene
  Vinyl Chloride

- Fill Area I, AA-I-S2:
  Benzene
  Chlorobenzene
  Trichloroethene
  Vinyl Chloride

- Fill Area I, EE-12:
  Benzene
  Chlorobenzene

- Fill Area I, EE-14:
  Benzene
  Chlorobenzene

- Fill Area L, EEG-109:
  Benzene
  Chloroform

MLE INDOOR AIR CONCENTRATIONS

- Fill Area G:
  - 4-Methyl-2-Pentanone
  - Benzene
  - Chlorobenzene
  - Naphthalene
  - Tetrachloroethene
  - Toluene
  - Trichloroethene
  - Vinyl Chloride
- Fill Area H:
  - 1,1,2,2-Tetrachloroethene
  - Benzene
  - Chlorobenzene
  - Chloroform
  - Ethylbenzene
  - Naphthalene
  - Trichloroethene
- Fill Area I:
  - Benzene
  - Chlorobenzene
  - Trichloroethene
  - Vinyl Chloride
- Fill Area L:
  - Benzene
  - Chloroform

REFERENCES:

Johnson, P.C. and R.A. Ettinger. 1991. Heuristic Model for Predicting the Intrusion Rate of Contaminant Vapors into Buildings. Environmental Science and Technology. 25:1445-1452.

USEPA. 1997. User's Guide for the Johnson and Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings. U.S. Environmental Protection Agency Office of Emergency and Remedial Response. Toxics Integration Branch. Washington, D.C.

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	**ENTER** Initial groundwater conc., C_W (μg/L)	Chemical
71432	110	Benzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	**ENTER** Depth below grade to water table, L_{WT} (cm)	**ENTER** SCS soil type directly above water table	**ENTER** Average soil/ groundwater temperature, T_S (°C)
15	540	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	**ENTER** User-defined vadose zone soil vapor permeability, k_v (cm^2)	**ENTER** Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	**ENTER** Vadose zone soil total porosity, n^V (unitless)	**ENTER** Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	**ENTER** Target hazard quotient for noncarcinogens, THQ (unitless)	**ENTER** Averaging time for carcinogens, AT_C (yrs)	**ENTER** Averaging time for noncarcinogens, AT_{NC} (yrs)	**ENTER** Exposure duration, ED (yrs)	**ENTER** Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EE-05\Benzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
525	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
5.63E+04	9.24E+05	4.16E-04	15	8,122	2.69E-03	1.16E-01	1.75E-04	5.42E-04	4.03E-05	2.07E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (μg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m³)	Unit risk factor, URF (μg/m³)$^{-1}$	Reference conc., RfC (mg/m³)
525	15	1.27E+04	0.10	8.35E-01	5.42E-04	3.84E+02	1.43E+26	4.50E-06	5.74E-02	8.3E-06	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
108907	620	Chlorobenzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	540	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EE-05\Chlorobenzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
525	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, h (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	9,803	1.54E-03	6.65E-02	1.75E-04	4.55E-04	4.66E-05	2.13E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
525	15	4.12E+04	0.10	8.35E-01	4.55E-04	3.84E+02	1.31E+31	4.59E-06	1.89E-01	NA	2.0E-02

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
91203	390	Naphthalene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	540	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EE-05\Naphthalene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
525	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
5.63E+04	9.24E+05	4.16E-04	15	12,913	1.52E-04	6.55E-03	1.75E-04	4.70E-04	2.62E-04	4.26E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m³)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m³)
525	15	2.56E+03	0.10	8.35E-01	4.70E-04	3.84E+02	1.40E+30	7.01E-06	1.79E-02	NA	1.4E-01

Site-Specific Soil Parameters

Site Name: Sauget Area 1 | Job ID: MIBK
Location: Sauget Illinois | Date: 15-Nov-00
Compl. By: Marcus

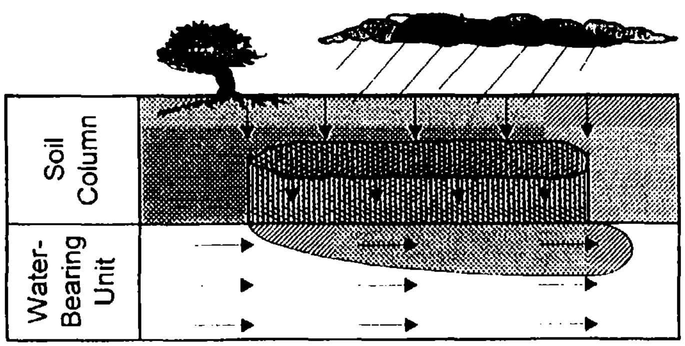
1. Soil Source Zone Characteristics (?)

Hydrogeology

	General Case Construction	
Depth to water-bearing unit	491	(cm)
Capillary zone thickness	11	(cm)
Soil column thickness	480	(cm)

Affected Soil Zone

Depth to top of affected soils			(cm)
Depth to base of affected soils			(cm)
Affected soil area			(cm^2)
Length of affected soil parallel to assumed wind direction			(cm)
Length of affected soil parallel to assumed GW flow direction			(cm)



2. Surface Soil Column

Vadose Zone | Capillary Fringe

Predominant USCS Soil Type

ults (?)

or [Calculate]

	Vadose Zone	Capillary Fringe	
	or		
Total porosity	0.43		(-)
Volumetric water content	0.3	0.387	(-)
Volumetric air content	0.13	0.043	(-)
Dry bulk density	1.5		(kg/L)
Vertical hydraulic conductivity	8.6E-1		(cm/d)
Vapor permeability	1.0E-11		(cm^2)
Capillary zone thickness	1.1E+1		(cm)

Net Rainfall Infiltration

Net infiltration estimate			(in/yr)
or	NA	or	
Average annual precipitation			(in/yr)

Partitioning Parameters

Fraction organic carbon	0.002	(-)
Soil/water pH	7.57	(-)

3. Commands and Options

Main Screen | Use Default Values | Print Sheet
Set Units | | Help

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ **(CHECKED IF PATHWAY IS ACTIVE)**

GROUNDWATER: VAPOR INTRUSION INTO ON-SITE BUILDINGS	Exposure Concentration				
	1) Source Medium	2) NAF Value (m^3/L) Receptor	3) Exposure Medium Indoor Air: POE Conc. (mg/m^3) (1) / (2)	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)	5) Average Inhalation Exposure Concentration (mg/m^3) (3) X (4)
Constituents of Concern	Groundwater Conc. (mg/L)	Commercial	Commercial	Commercial	Commercial
Methyl-2-pentanone, 4-	1.3E+0	3.1E+3	4.2E-4	6.8E-1	2.8E-4

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Sauget Area 1
Site Location: Sauget Illinois
Completed By: Marcus

Date Completed: 15-Nov-00
Job ID: MIBK

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
71432	347.8	Benzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	530.8	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EEG-107\Benzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, q_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $q_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $q_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
515.8	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, h (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $DH_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, m_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
5.63E+04	9.24E+05	4.16E-04	15	8,122	2.69E-03	1.16E-01	1.75E-04	5.42E-04	4.03E-05	2.05E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, a (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m³)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m³)
515.8	15	4.03E+04	0.10	8.35E-01	5.42E-04	3.84E+02	1.43E+26	4.53E-06	1.82E-01	8.3E-06	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
108907	466.1	Chlorobenzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/groundwater temperature, T_S (°C)
15	530.8	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EEG-107\Chlorobenzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
515.8	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	9,803	1.54E-03	6.65E-02	1.75E-04	4.55E-04	4.66E-05	2.11E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
515.8	15	3.10E+04	0.10	8.35E-01	4.55E-04	3.84E+02	1.31E+31	4.61E-06	1.43E-01	NA	2.0E-02

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
91203	230.5	Naphthalene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	530.8	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EEG-107\Naphthalene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
515.8	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	12,913	1.52E-04	6.55E-03	1.75E-04	4.70E-04	2.62E-04	4.25E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF (mg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
515.8	15	1.51E+03	0.10	8.35E-01	4.70E-04	3.84E+02	1.40E+30	7.07E-06	1.07E-02	NA	1.4E-01

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
127184	20.5	Tetrachloroethylene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/groundwater temperature, T_S (°C)
15	530.8	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EEG-107\Tetrachloroethene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
515.8	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	9,553	7.83E-03	3.37E-01	1.75E-04	4.39E-04	2.33E-05	1.31E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF (mg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
515.8	15	6.91E+03	0.10	8.35E-01	4.39E-04	3.84E+02	1.94E+32	3.25E-06	2.24E-02	5.8E-07	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
108883	863.8	Toluene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	530.8	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EEG-107\toluene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
515.8	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	9,154	2.92E-03	1.26E-01	1.75E-04	5.34E-04	3.66E-05	1.91E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
515.8	15	1.09E+05	0.10	8.35E-01	5.34E-04	3.84E+02	3.39E+26	4.30E-06	4.68E-01	NA	4.0E-01

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
79016	20.9	Trichloroethylene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	530.8	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm²)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm³)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm³/cm³)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EEG-107\Trichloroethylene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
515.8	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, h (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
5.63E+04	9.24E+05	4.16E-04	15	8,557	4.79E-03	2.06E-01	1.75E-04	4.83E-04	2.93E-05	1.59E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m³)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m³)
515.8	15	4.31E+03	0.10	8.35E-01	4.83E-04	3.84E+02	2.11E+29	3.76E-06	1.62E-02	1.7E-06	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
75014	8.6	Vinyl chloride (chloroethene)

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	530.8	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EEG-107\Vinyl Chloride.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
515.8	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
5.63E+04	9.24E+05	4.16E-04	15	5,000	1.73E-02	7.46E-01	1.75E-04	6.43E-04	2.70E-05	1.60E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m³)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m³)
515.8	15	6.41E+03	0.10	8.35E-01	6.43E-04	3.84E+02	1.11E+22	3.78E-06	2.43E-02	8.4E-05	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
79345	12	1,1,2,2-Tetrachloroethane

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	442	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EE-01\1,1,2,2-Tetrachloroethane.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, q_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $q_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $q_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
427	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, h (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $DH_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, m_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	10,540	1.34E-04	5.77E-03	1.75E-04	5.65E-04	3.13E-04	5.01E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, a (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF ($(mg/m^3)^{-1}$)	Reference conc., RfC (mg/m^3)
427	15	6.92E+01	0.10	8.35E-01	5.65E-04	3.84E+02	1.22E+25	8.37E-06	5.79E-04	5.8E-05	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
71432	1500	Benzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/groundwater temperature, T_S (°C)
15	442	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EE-01\Benzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
427	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
5.63E+04	9.24E+05	4.16E-04	15	8,122	2.69E-03	1.16E-01	1.75E-04	5.42E-04	4.03E-05	1.82E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m³)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m³)
427	15	1.74E+05	0.10	8.35E-01	5.42E-04	3.84E+02	1.43E+26	4.74E-06	8.23E-01	8.3E-06	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemica
108907	1200	Chlorobenzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	442	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EE-01\Chlorobenzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
427	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	9,803	1.54E-03	6.65E-02	1.75E-04	4.55E-04	4.66E-05	1.90E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
427	15	7.97E+04	0.10	8.35E-01	4.55E-04	3.84E+02	1.31E+31	4.88E-06	3.89E-01	NA	2.0E-02

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
100414	1800	Ethylbenzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/groundwater temperature, T_S (°C)
15	442	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EE-01\Ethylbenzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
427	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	10,155	3.18E-03	1.37E-01	1.75E-04	4.60E-04	3.11E-05	1.44E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
427	15	2.46E+05	0.10	8.35E-01	4.60E-04	3.84E+02	6.13E+30	4.02E-06	9.90E-01	NA	1.0E+00

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
91203	2300	Naphthalene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	442	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EE-01\Naphthalene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, q_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $q_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $q_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
427	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, h (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $DH_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, m_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
5.63E+04	9.24E+05	4.16E-04	15	12,913	1.52E-04	6.55E-03	1.75E-04	4.70E-04	2.62E-04	4.17E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, a (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m³)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m³)
427	15	1.51E+04	0.10	8.35E-01	4.70E-04	3.84E+02	1.40E+30	7.70E-06	1.16E-01	NA	1.4E-01

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
71432	2250	Benzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	442	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EE-02\Benzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
427	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, h (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	8,122	2.69E-03	1.16E-01	1.75E-04	5.42E-04	4.03E-05	1.82E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF (mg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
427	15	2.60E+05	0.10	8.35E-01	5.42E-04	3.84E+02	1.43E+26	4.74E-06	1.23E+00	8.3E-06	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
108907	4350	Chlorobenzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/groundwater temperature, T_S (°C)
15	442	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm²)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm³)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm³/cm³)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EE-02\Chlorobenzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, q_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $q_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $q_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
427	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, h (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $DH_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, m_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
5.63E+04	9.24E+05	4.16E-04	15	9,803	1.54E-03	6.65E-02	1.75E-04	4.55E-04	4.66E-05	1.90E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, a (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m³)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m³)
427	15	2.89E+05	0.10	8.35E-01	4.55E-04	3.84E+02	1.31E+31	4.88E-06	1.41E+00	NA	2.0E-02

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
67663	425	Chloroform

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	442	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EE-02\Chloroform.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, q_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $q_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $q_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
427	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, h (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $DH_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, m_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
5.63E+04	9.24E+05	4.16E-04	15	7,554	1.86E-03	8.02E-02	1.75E-04	6.43E-04	5.30E-05	2.31E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, a (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m³)	Unit risk factor, URF (mg/m³)$^{-1}$	Reference conc., RfC (mg/m³)
427	15	3.41E+04	0.10	8.35E-01	6.43E-04	3.84E+02	1.12E+22	5.56E-06	1.89E-01	2.3E-05	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
91203	195	Naphthalene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	442	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EE-02\Naphthalene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, q_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $q_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $q_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
427	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, h (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $DH_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} ($atm-m^3/mol$)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, m_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	12,913	1.52E-04	6.55E-03	1.75E-04	4.70E-04	2.62E-04	4.17E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, a (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
427	15	1.28E+03	0.10	8.35E-01	4.70E-04	3.84E+02	1.40E+30	7.70E-06	9.83E-03	NA	1.4E-01

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
79016	49.5	Trichloroethylene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/groundwater temperature, T_S (°C)
15	442	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EE-02\Trichloroethene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
427	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	8,557	4.79E-03	2.06E-01	1.75E-04	4.83E-04	2.93E-05	1.39E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
427	15	1.02E+04	0.10	8.35E-01	4.83E-04	3.84E+02	2.11E+29	3.93E-06	4.01E-02	1.7E-06	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
71432	620	Benzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	506	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

AA-I-S1\Benzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
491	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	8,122	2.69E-03	1.16E-01	1.75E-04	5.42E-04	4.03E-05	1.99E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF (mg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
491	15	7.18E+04	0.10	8.35E-01	5.42E-04	3.84E+02	1.43E+26	4.58E-06	3.29E-01	8.3E-06	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
108907	8700	Chlorobenzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	506	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm²)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm³)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm³/cm³)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

AA-I-S1\Chlorobenzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
491	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	9,803	1.54E-03	6.65E-02	1.75E-04	4.55E-04	4.66E-05	2.05E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
491	15	5.78E+05	0.10	8.35E-01	4.55E-04	3.84E+02	1.31E+31	4.68E-06	2.71E+00	NA	2.0E-02

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
75014	970	Vinyl chloride (chloroethene)

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	506	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

AA-I-S1\Vinyl Chloride.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
491	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
5.63E+04	9.24E+05	4.16E-04	15	5,000	1.73E-02	7.46E-01	1.75E-04	6.43E-04	2.70E-05	1.54E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m³)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m³)
491	15	7.24E+05	0.10	8.35E-01	6.43E-04	3.84E+02	1.11E+22	3.82E-06	2.76E+00	8.4E-05	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
71432	120	Benzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/groundwater temperature, T_S (°C)
15	506	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

AA-I-S2\Benzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, q_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $q_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $q_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
491	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, h (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $DH_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, m_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	8,122	2.69E-03	1.16E-01	1.75E-04	5.42E-04	4.03E-05	1.99E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, a (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF (mg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
491	15	1.39E+04	0.10	8.35E-01	5.42E-04	3.84E+02	1.43E+26	4.58E-06	6.37E-02	8.3E-06	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
108907	3200	Chlorobenzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	506	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

AA-I-S2\Chlorobenzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, q_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $q_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $q_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
491	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, h (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $DH_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, m_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	9,803	1.54E-03	6.65E-02	1.75E-04	4.55E-04	4.66E-05	2.05E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, a (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
491	15	2.13E+05	0.10	8.35E-01	4.55E-04	3.84E+02	1.31E+31	4.68E-06	9.96E-01	NA	2.0E-02

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
79016	180	Trichloroethylene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	506	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

AA-I-S2\Trichloroethylene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
491	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
5.63E+04	9.24E+05	4.16E-04	15	8,557	4.79E-03	2.06E-01	1.75E-04	4.83E-04	2.93E-05	1.53E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m³)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m³)
491	15	3.71E+04	0.10	8.35E-01	4.83E-04	3.84E+02	2.11E+29	3.81E-06	1.41E-01	1.7E-06	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
75014	240	Vinyl chloride (chloroethene)

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	506	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

AA-I-S2\Vinyl Chloride.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
491	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
5.63E+04	9.24E+05	4.16E-04	15	5,000	1.73E-02	7.46E-01	1.75E-04	6.43E-04	2.70E-05	1.54E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m³)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m³)
491	15	1.79E+05	0.10	8.35E-01	6.43E-04	3.84E+02	1.11E+22	3.82E-06	6.83E-01	8.4E-05	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
71432	680	Benzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	506	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EE-12\Benzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
491	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	8,122	2.69E-03	1.16E-01	1.75E-04	5.42E-04	4.03E-05	1.99E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF (mg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
491	15	7.87E+04	0.10	8.35E-01	5.42E-04	3.84E+02	1.43E+26	4.58E-06	3.61E-01	8.3E-06	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
108907	1400	Chlorobenzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	506	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EE-12\Chlorobenzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, q_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $q_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $q_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
491	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, h (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $DH_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, m_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	9,803	1.54E-03	6.65E-02	1.75E-04	4.55E-04	4.66E-05	2.05E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, a (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
491	15	9.30E+04	0.10	8.35E-01	4.55E-04	3.84E+02	1.31E+31	4.68E-06	4.36E-01	NA	2.0E-02

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
71432	750	Benzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	506	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EE-14\Benzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, q_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $q_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $q_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
491	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, h (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $DH_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, m_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	8,122	2.69E-03	1.16E-01	1.75E-04	5.42E-04	4.03E-05	1.99E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, a (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
491	15	8.68E+04	0.10	8.35E-01	5.42E-04	3.84E+02	1.43E+26	4.58E-06	3.98E-01	8.3E-06	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
108907	1400	Chlorobenzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	506	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EE-14\Chlorobenzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, q_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $q_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $q_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
491	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, h (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $DH_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, m_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	9,803	1.54E-03	6.65E-02	1.75E-04	4.55E-04	4.66E-05	2.05E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, a (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
491	15	9.30E+04	0.10	8.35E-01	4.55E-04	3.84E+02	1.31E+31	4.68E-06	4.36E-01	NA	2.0E-02

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
71432	44	Benzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	466	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm²)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm³)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm³/cm³)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EEG-109\Benzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
451	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	8,122	2.69E-03	1.16E-01	1.75E-04	5.42E-04	4.03E-05	1.88E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF (mg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
451	15	5.09E+03	0.10	8.35E-01	5.42E-04	3.84E+02	1.43E+26	4.68E-06	2.38E-02	8.3E-06	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
67663	76	Chloroform

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/groundwater temperature, T_S (°C)
15	466	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

EEG-109\Chloroform.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
451	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	7,554	1.86E-03	8.02E-02	1.75E-04	6.43E-04	5.30E-05	2.40E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
451	15	6.09E+03	0.10	8.35E-01	6.43E-04	3.84E+02	1.12E+22	5.49E-06	3.34E-02	2.3E-05	NA

Site-Specific Soil Parameters

Site Name: Sauget Area 1 Job ID: MLE Area G MIBK
Location: Sauget Illinois Date: 1-Dec-00
Compl. By: Angela

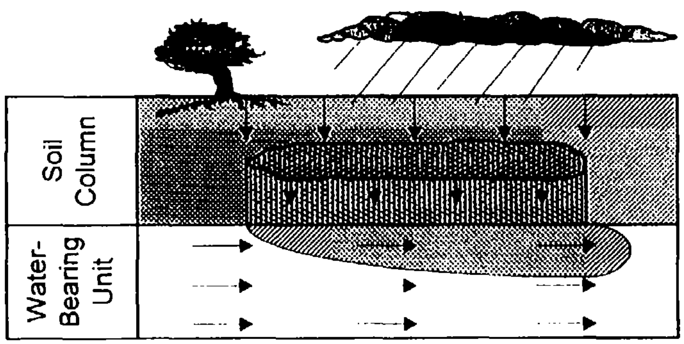
1. Soil Source Zone Characteristics (?)

Hydrogeology

	General Case	Construction	
Depth to water-bearing unit	530.8		(cm)
Capillary zone thickness	11		(cm)
Soil column thickness	519.8		(cm)

Affected Soil Zone

	General Case	Construction	
Depth to top of affected soils	0		(cm)
Depth to base of affected soils	0		(cm)
Affected soil area	0	0	(cm^2)
Length of affected soil parallel to assumed wind direction	0	0	(cm)
Length of affected soil parallel to assumed GW flow direction	0		(cm)



2. Surface Soil Column

Vadose Zone Capillary Fringe

Predominant USCS Soil Type

ults (?)

or Calculate

	Vadose Zone	Capillary Fringe	
	or		
Total porosity	0.43		(-)
Volumetric water content	0.3	0.387	(-)
Volumetric air content	0.13	0.043	(-)
Dry bulk density	1.5		(kg/L)
Vertical hydraulic conductivity	8.6E-1		(cm/d)
Vapor permeability	1.0E-11		(cm^2)
Capillary zone thickness	1.1E+1		(cm)

Net Rainfall Infiltration

Net infiltration estimate		(in/yr)
or (NA)	or	
Average annual precipitation		(in/yr)

Partitioning Parameters

Fraction organic carbon	0.002	(-)
Soil/water pH	7.57	(-)

3. Commands and Options

Main Screen | Use Default Values | Print Sheet
Set Units | Help

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ **(CHECKED IF PATHWAY IS ACTIVE)**

GROUNDWATER: VAPOR INTRUSION INTO ON-SITE BUILDINGS	Exposure Concentration				
	1) Source Medium	2) NAF Value (m^3/L) Receptor	3) Exposure Medium Indoor Air: POE Conc (mg/m^3) (1) / (2)	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)	5) Average Inhalation Exposure Concentration (mg/m^3) (3) X (4)
Constituents of Concern	Groundwater Conc. (mg/L)	Commercial	Commercial	Commercial	Commercial
Methyl-2-pentanone, 4-	1.4E-1	3.3E+3	4.2E-5	6.8E-1	2.9E-5

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Sauget Area 1
Site Location: Sauget Illinois
Completed By: Angela

Date Completed: 1-Dec-00
Job ID: MLE:Area G MIBK

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
71432	347.8	Benzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/groundwater temperature, T_S (°C)
15	530.8	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

Fill Area G\Benzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
515.8	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	8,122	2.69E-03	1.16E-01	1.75E-04	5.42E-04	4.03E-05	2.05E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF (mg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
515.8	15	4.03E+04	0.10	8.35E-01	5.42E-04	3.84E+02	1.43E+26	4.53E-06	1.82E-01	8.3E-06	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
108907	466.1	Chlorobenzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	530.8	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

Fill Area G\Chlorobenzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
515.8	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	9,803	1.54E-03	6.65E-02	1.75E-04	4.55E-04	4.66E-05	2.11E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF (mg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
515.8	15	3.10E+04	0.10	8.35E-01	4.55E-04	3.84E+02	1.31E+31	4.61E-06	1.43E-01	NA	2.0E-02

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
91203	230.5	Naphthalene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	530.8	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

Fill Area G\Naphthalene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, q_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $q_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $q_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
515.8	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, h (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $DH_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, m_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	12,913	1.52E-04	6.55E-03	1.75E-04	4.70E-04	2.62E-04	4.25E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, a (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
515.8	15	1.51E+03	0.10	8.35E-01	4.70E-04	3.84E+02	1.40E+30	7.07E-06	1.07E-02	NA	1.4E-01

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
127184	20.5	Tetrachloroethylene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	530.8	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

Fill Area G\Tetrachloroethene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
515.8	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	9,553	7.83E-03	3.37E-01	1.75E-04	4.39E-04	2.33E-05	1.31E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
515.8	15	6.91E+03	0.10	8.35E-01	4.39E-04	3.84E+02	1.94E+32	3.25E-06	2.24E-02	5.8E-07	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
108883	862.8	Toluene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	530.8	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

Fill Area G\toluene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
515.8	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
5.63E+04	9.24E+05	4.16E-04	15	9,154	2.92E-03	1.26E-01	1.75E-04	5.34E-04	3.66E-05	1.91E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m³)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m³)
515.8	15	1.09E+05	0.10	8.35E-01	5.34E-04	3.84E+02	3.39E+26	4.30E-06	4.67E-01	NA	4.0E-01

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
79016	20.9	Trichloroethylene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	530.8	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)		ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL	OR		1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

Fill Area G\Trichloroethylene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
515.8	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
5.63E+04	9.24E+05	4.16E-04	15	8,557	4.79E-03	2.06E-01	1.75E-04	4.83E-04	2.93E-05	1.59E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m³)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m³)
515.8	15	4.31E+03	0.10	8.35E-01	4.83E-04	3.84E+02	2.11E+29	3.76E-06	1.62E-02	1.7E-06	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
75014	8.6	Vinyl chloride (chloroethene)

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/groundwater temperature, T_S (°C)
15	530.8	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

Fill Area G\Vinyl Chloride.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
515.8	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	5,000	1.73E-02	7.46E-01	1.75E-04	6.43E-04	2.70E-05	1.60E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF (mg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
515.8	15	6.41E+03	0.10	8.35E-01	6.43E-04	3.84E+02	1.11E+22	3.78E-06	2.43E-02	8.4E-05	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
79345	5.7	1,1,2,2-Tetrachloroethane

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/groundwater temperature, T_S (°C)
15	693.6	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

Fill Area H\1,1,2,2-Tetrachloroethane.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
678.6	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	10,540	1.34E-04	5.77E-03	1.75E-04	5.65E-04	3.13E-04	5.23E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF (mg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
678.6	15	3.29E+01	0.10	8.35E-01	5.65E-04	3.84E+02	1.22E+25	6.82E-06	2.24E-04	5.8E-05	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
71432	937.8	Benzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/groundwater temperature, T_S (°C)
15	693.6	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

Fill Area H\Benzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
678.6	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
5.63E+04	9.24E+05	4.16E-04	15	8,122	2.69E-03	1.16E-01	1.75E-04	5.42E-04	4.03E-05	2.41E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m³)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m³)
678.6	15	1.09E+05	0.10	8.35E-01	5.42E-04	3.84E+02	1.43E+26	4.18E-06	4.54E-01	8.3E-06	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
108907	1391.6	Chlorobenzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	693.6	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

Fill Area H\Chlorobenzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
678.6	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	9,803	1.54E-03	6.65E-02	1.75E-04	4.55E-04	4.66E-05	2.42E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF ($(mg/m^3)^{-1}$)	Reference conc., RfC (mg/m^3)
678.6	15	9.25E+04	0.10	8.35E-01	4.55E-04	3.84E+02	1.31E+31	4.19E-06	3.88E-01	NA	2.0E-02

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
67663	120	Chloroform

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/groundwater temperature, T_S (°C)
15	693.6	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

Fill Area H\Chloroform.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
678.6	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
5.63E+04	9.24E+05	4.16E-04	15	7,554	1.86E-03	8.02E-02	1.75E-04	6.43E-04	5.30E-05	3.03E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m³)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m³)
678.6	15	9.62E+03	0.10	8.35E-01	6.43E-04	3.84E+02	1.12E+22	4.90E-06	4.72E-02	2.3E-05	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
100414	498.1	Ethylbenzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	693.6	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

Fill Area H\Ethylbenzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, q_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $q_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $q_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
678.6	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, h (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $DH_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, m_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	10,155	3.18E-03	1.37E-01	1.75E-04	4.60E-04	3.11E-05	1.93E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, a (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
678.6	15	6.81E+04	0.10	8.35E-01	4.60E-04	3.84E+02	6.13E+30	3.55E-06	2.42E-01	NA	1.0E+00

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
91203	626.3	Naphthalene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	693.6	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

Fill Area H\Naphthalene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
678.6	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
5.63E+04	9.24E+05	4.16E-04	15	12,913	1.52E-04	6.55E-03	1.75E-04	4.70E-04	2.62E-04	4.35E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m³)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m³)
678.6	15	4.10E+03	0.10	8.35E-01	4.70E-04	3.84E+02	1.40E+30	6.15E-06	2.52E-02	NA	1.4E-01

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
79016	19.8	Trichloroethylene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	693.6	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

Fill Area H\Trichloroethene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
678.6	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, h (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	8,557	4.79E-03	2.06E-01	1.75E-04	4.83E-04	2.93E-05	1.89E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
678.6	15	4.08E+03	0.10	8.35E-01	4.83E-04	3.84E+02	2.11E+29	3.49E-06	1.43E-02	1.7E-06	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
71432	278.8	Benzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	716.5	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

Area I\Benzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, q_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $q_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $q_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
701.5	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, h (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $DH_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, m_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
5.63E+04	9.24E+05	4.16E-04	15	8,122	2.69E-03	1.16E-01	1.75E-04	5.42E-04	4.03E-05	2.45E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, a (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m³)	Unit risk factor, URF (mg/m³)$^{-1}$	Reference conc., RfC (mg/m³)
701.5	15	3.23E+04	0.10	8.35E-01	5.42E-04	3.84E+02	1.43E+26	4.13E-06	1.33E-01	8.3E-06	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
108907	1744.3	Chlorobenzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	716.5	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

Area I\Chlorobenzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
701.5	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	9,803	1.54E-03	6.65E-02	1.75E-04	4.55E-04	4.66E-05	2.46E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF (mg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
701.5	15	1.16E+05	0.10	8.35E-01	4.55E-04	3.84E+02	1.31E+31	4.14E-06	4.80E-01	NA	2.0E-02

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
79016	31.7	Trichloroethylene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	716.5	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

Area I\Trichloroethylene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
701.5	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, h (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $DH_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, m_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	8,557	4.79E-03	2.06E-01	1.75E-04	4.83E-04	2.93E-05	1.93E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, a (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF (mg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
701.5	15	6.54E+03	0.10	8.35E-01	4.83E-04	3.84E+02	2.11E+29	3.46E-06	2.26E-02	1.7E-06	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
75014	157.9	Vinyl chloride (chloroethene)

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/groundwater temperature, T_S (°C)
15	716.5	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

Area I\Vinyl Chloride.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
701.5	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	5,000	1.73E-02	7.46E-01	1.75E-04	6.43E-04	2.70E-05	2.00E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF (mg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
701.5	15	1.18E+05	0.10	8.35E-01	6.43E-04	3.84E+02	1.11E+22	3.55E-06	4.18E-01	8.4E-05	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
71432	7.8	Benzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	472.6	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

Area L\Benzene.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, q_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $q_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $q_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
457.6	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, h (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $DH_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} ($atm-m^3/mol$)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, m_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
5.63E+04	9.24E+05	4.16E-04	15	8,122	2.69E-03	1.16E-01	1.75E-04	5.42E-04	4.03E-05	1.90E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, a (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
457.6	15	9.03E+02	0.10	8.35E-01	5.42E-04	3.84E+02	1.43E+26	4.66E-06	4.21E-03	8.3E-06	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (mg/L)	Chemical
67663	14.8	Chloroform

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/groundwater temperature, T_S (°C)
15	472.6	SIL	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
SIL			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

Area L\Chloroform.xls\DATENTER

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
457.6	0.130	0.642	1.67E-09	0.519	8.65E-10	68.18	0.43	0.050	0.380	3,844

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, h (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $DH_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, m_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
5.63E+04	9.24E+05	4.16E-04	15	7,554	1.86E-03	8.02E-02	1.75E-04	6.43E-04	5.30E-05	2.42E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, a (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m³)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m³)
457.6	15	1.19E+03	0.10	8.35E-01	6.43E-04	3.84E+02	1.12E+22	5.47E-06	6.49E-03	2.3E-05	NA

APPENDIX L

CALCULATION OF EXCAVATION AIR VOC CONCENTRATIONS FROM STANDING WATER

APPENDIX L
CALCULATION OF EXCAVATION AIR VOC CONCENTRATIONS FROM STANDING WATER - EXCAVATION TRENCH

Excavation trench air concentrations of a COPC resulting from volatilization from groundwater infiltrating an excavation trench can be predicted by use of the method recommended by USEPA (1987) for predicting volatilization from standing water. The air concentration of a COPC is estimated at the downwind boundary of the water. For the purposes of calculating this concentration, a rectangular box with the base corresponding to the water surface is considered. The height of the box, H_b, is the height to which the chemical emissions from the water surface are uniformly mixed with the air. L_b is the dimension of the box parallel to the direction of the wind. W_b is the width of the box perpendicular to the air flow. If U is the wind speed, then, by conservation of mass, the air concentration, C_a, of chemical within the box is given by:

$$C_a = \frac{Q}{H_b \times W_b \times U}$$

The diffusion height, H, above the water surface is approximately equal to 0.05 x L_b (Jackson, 1976). With this substitution, the equation for the air concentration becomes:

$$C_a = \frac{Q}{0.05 \times A \times U}$$

Where:

Q = chemical emission rate (g/s)

A = water surface area (m^2) (12 m^2; best professional judgement estimate of utility repair/installation trench)

U = wind speed (m/s) (2.25 mg/s; default value USEPA, 1991)

$$Q = K \times A \times C_L$$

Where:

Q = chemical emission rate (g/s)

A = water surface area (m^2) (12 m^2; best professional judgement estimate of utility repair/installation trench)

C_L= chemical concentration in water (g/m^3)

The overall mass transfer coefficient, K, is given by:

$$\frac{1}{K} = \frac{1}{K_L} + \frac{1}{K_G K_{eq}}$$

Where:

$$K_{eq} = \frac{H}{RT}$$

H = Henry's Law constant for the compound (atm m^3/g-mol)

R = Universal Gas Constant (8.21 x 10^{-5} atm m^3/g-mol)

T = Water Temperature (°K)

K_L = Liquid phase mass transfer coefficient (m/s)

K_G = Gas phase mass transfer coefficient (m/s)

The Henry's Law constants for each compound were obtained from the RBCA Tool Kit for Chemical Releases software (GSI, 1999). The liquid phase mass transfer coefficient is given by:

$$K_L = 2.78 \times 10^{-6} \left(\frac{D_w}{D_{ether}} \right)^{2/3}$$

Where:

D_w = Diffusivity of the compound in water (cm^2/s)

D_{ether} = Diffusivity of ether in water (8.5 x 10^{-6} cm^2/s; USEPA, 1987).

The diffusivity of each compound in water was obtained from the RBCA Tool Kit for Chemical Releases software (GSI, 1999).

The gas phase mass transfer coefficient is given by:

$$K_G = 4.82 \times 10^{-3} U^{0.78} Sc_G^{-0.67} d_e^{-0.11}$$

Where:

U = wind speed (m/s)

Sc_g = Schmidt number = $\mu_G/(\Delta_G D_a)$

μ_G = viscosity of air (1.81×10^{-4} g/cm-s)

Δ_G = density of air (1.2×10^{-3} g/cm^3)

D_a = diffusivity of the chemical in air (cm^2/s)

d_e = effective diameter (m) = $(4A/B)^{0.5}$

For each of the compounds the molecular diffusivity in air was obtained from the RBCA Tool Kit for Chemical Releases software (GSI, 1999).

Table L-1 summarizes model inputs and intermediate steps in the modeling process. Tables L-2 and L-3 present the RME and MLE groundwater source concentrations utilized in predicting trench air concentrations. Tables L-4 and L-5 present the predicted RME and MLE trench air concentrations for volatile COPCs.

REFERENCES:

GSI, 1999. RBCA Tool Kit for Chemical Releases Software. Groundwater Services, Inc. Houston, Texas.

USEPA. 1987. Hazardous Waste Treatment, Storage and Disposal Facilities (TDSF) – Air Emission Models. EPA-450/3-87-026. December 1987.

USEPA. 1991. Risk Assessment Guidance for Superfund: Volume I – Human Health Evaluation Manual (Part B, Development of Risk-based Preliminary Remediation Goals). Interim. Office of Emergency and Remedial Response. U.S. Environmental Protection Agency.

Jackson, N.A. 1976. The Propagation of Modified Flow Downstream of a Change in Roughness. Quarterly Journal of the Royal Meteorological Society. 102:924.

TABLE L-1

MODEL SUMMARY FOR PREDICTION OF TRENCH AIR CONCENTRATION DUE TO VOLATILIZATION FROM EXPOSED GROUNDWATER

SAUGET AREA 1 - EE/CA AND RI/FS

HUMAN HEALTH RISK ASSESSMENT

*** Input Parameters ***

Water temperature (degK)	298 15
Viscosity of water (cp)	0 8904
Wetted area (m**2)	12
Wind speed (m/s)	2 25

*** Constants ***

Gas const. (atm m**3/(mol degK))	8 21E-05
Diff. of ether in H2O (cm**2/s)	8 50E-06
Viscosity of air (g/(cm s))	1 81E-04
Density of air (g/cm**3)	1 20E-03

*** Calculated Parameter ***

Effective diameter of source (m)	3 909

*** Chemical-Specific Parameters ***

	Molecular Weight (a)	Henry's Law Coefficient (atm*m**3/g-mole) (a)	Diffusivity In Air (cm**2/s) (a)	Diffusivity In Water (cm**2/s) (a)	Keq (b)	Kl (m/s) (b)	SCg (b)	Kg (m/s) (b)	K (m/s) (b)	Q (m3/s) (b)	Groundwater-to Air Attenuation Factor (L/m3) (b)
1,1,2,2-Tetrachloroethane	168	2.00E-03	7.10E-02	7.90E-06	8.17E-02	2.65E-06	2.12E+00	4.71E-03	2.63E-06	3.16E-05	2.34E-02
4-Methyl-2-Pentanone	100 2	4.16E-04	7.35E-02	8.68E-05	1 70E-02	1.31E-05	2.05E+00	4.82E-03	1.13E-05	1.35E-04	1.00E-01
BENZENE	78.11	5.55E-03	8.80E-02	9.80E-06	2 27E-01	3.06E-06	1.71E+00	5.44E-03	3 05E-06	3.66E-05	2 71E-02
CHLOROBENZENE	112.56	3.70E-03	7.30E-02	8.70E-06	1.51E-01	2.82E-06	2.07E+00	4.80E-03	2.81E-06	3.37E-05	2.50E-02
CHLOROFORM	119.4	3.39E-03	1.04E-01	1.00E-05	1.38E-01	3.10E-06	1.45E+00	6.09E-03	3.09E-06	3.70E-05	2.74E-02
ETHYLBENZENE	106.17	7.88E-03	7.50E-02	7.80E-06	3.22E-01	2.63E-06	2.01E+00	4.89E-03	2.62E-06	3.14E-05	2.33E-02
NAPHTHALENE	128.17	4.83E-04	5.90E-02	7.50E-06	1 97E-02	2.56E-06	2.56E+00	4.16E-03	2.48E-06	2.98E-05	2.20E-02
TETRACHLORORETHENE	165.83	1.84E-02	7 20E-02	8.20E-06	7 52E-01	2.71E-06	2.09E+00	4.76E-03	2.71E-06	3 25E-05	2.41E-02
TOLUENE	92.4	6.30E-03	8.50E-02	9.40E-06	2.57E-01	2 97E-06	1.77E+00	5.32E-03	2.97E-06	3 56E-05	2.64E-02
TRICHLOROETHENE	131.4	1.00E-02	8.18E-02	1.05E-04	4 09E-01	1.49E-05	1 84E+00	5.18E-03	1 48E-05	1.77E-04	1.31E-01
VINYLCHLORIDE	62.5	8.60E-02	1.06E-01	1.23E-05	3.51E+00	3.56E-06	1.42E+00	6.17E-03	3 56E-06	4 27E-05	3.16E-02

Notes

(a) GSI, 1999. RBCA Tool Kit for Chemical Releases software Groundwater Services, Inc Houston, Texas

(b) Calculated

Keq = equilibrium coefficient

Kl = liquid phase mass transfer coefficient

SCg = Schmidt number

Kg = gas phase mass transfer coefficent

K = overall mass transfer coefficient

Q = emission factor

TABLE L-2
EXPOSURE POINT CONCENTRATIONS (RME) - GROUNDWATER
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

		Groundwater EPCs (mg/L)								
	CAS	Fill Area G		Fill Area H		Fill Area I				Fill Area L
Constituent	**Number**	**EE-05**	**EEG-107**	**EE-01**	**EE-02**	**AA-I-S1**	**AA-I-S2**	**EE-12**	**EE-14**	**EEG-109**
1,1,2,2-Tetrachloroethane	79-34-5	--	--	1.20E-02	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	--	1.30E+00	--	--	--	--	--	--	--
Benzene	71-43-2	1.10E-01	3.70E+00	1.50E+00	2.25E+00	6.20E-01	1.20E-01	6.80E-01	7.50E-01	4.40E-02
Chlorobenzene	108-90-7	6.20E-01	4.30E+00	1.20E+00	4.35E+00	8.70E+00	3.20E+00	1.40E+00	3.80E+00	--
Chloroform	67-66-3	--	--	--	4.25E-01	--	--	--	--	7.60E-02
Ethylbenzene	100-41-4	--	--	1.80E+00	--	--	--	--	--	--
Naphthalene	91-20-3	3.90E-01	2.10E+00	2.30E+00	1.95E-01	--	--	--	--	--
Tetrachloroethene	127-18-4	--	1.70E-01	--	--	--	--	--	--	--
Toluene	108-88-3	--	8.50E+00	--	--	--	--	--	--	--
Trichloroethene	79-01-6	--	2.00E-01	--	4.95E-02	--	1.80E-01	--	--	--
Vinyl chloride	75-01-4	--	4.10E-02	--	--	9.70E-01	2.40E-01	--	--	--

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
RME - Reasonable Maximum Exposure.

TABLE L-3
EXPOSURE POINT CONCENTRATIONS (MLE) - GROUNDWATER
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	CAS Number	Groundwater EPCs (mg/L)									
		Fill Area G		Fill Area H		Fill Area I					Fill Area L
		EE-05	EEG-107	EE-01	EE-02	AA-I-S1	AA-I-S2	EE-12	EE-13	EE-14	EEG-109
1,1,2,2-Tetrachloroethane	79-34-5	--	--	1.20E-02	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	--	1.30E+00	--	--	--	--	--	--	--	--
Benzene	71-43-2	1.10E-01	3.70E+00	1.50E+00	2.25E+00	4.55E-01	6.13E-02	6.80E-01	--	7.50E-01	4.40E-02
Chlorobenzene	108-90-7	6.20E-01	4.30E+00	1.20E+00	4.35E+00	5.15E+00	1.66E+00	1.40E+00	--	3.80E+00	--
Chloroform	67-66-3	--	--	--	4.25E-01	--	--	--	--	--	7.60E-02
Ethylbenzene	100-41-4	--	--	1.80E+00	--	--	--	--	--	--	--
Naphthalene	91-20-3	3.90E-01	2.10E+00	2.30E+00	1.95E-01	--	--	--	--	--	--
Tetrachloroethene	127-18-4	--	1.70E-01	--	--	--	--	--	--	--	--
Toluene	108-88-3	--	8.50E+00	--	--	--	--	--	--	--	--
Trichloroethene	79-01-6	--	2.00E-01	--	4.95E-02	--	1.04E-01	--	--	--	--
Vinyl chloride	75-01-4	--	4.10E-02	--	--	7.35E-01	2.00E-01	--	--	--	--

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
MLE - Most Likely Exposure.

TABLE L-4
EXPOSURE POINT CONCENTRATIONS (RME) - EXCAVATION AIR, VOLATILIZATION FROM EXPOSED GROUNDWATER
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	CAS Number	Fill Area Excavation Air EPCs (mg/m3) (a)								
		G		H		I				L
		EE-05	EEG-107	EE-01	EE-02	AA-I-S1	AA-I-S2	EE-12	EE-14	EEG-109
1,1,2,2-Tetrachloroethane	79-34-5	--	--	2.80E-04	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	--	1.30E-01	--	--	--	--	--	--	--
Benzene	71-43-2	2.98E-03	1.00E-01	4.07E-02	6.10E-02	1.68E-02	3.25E-03	1.84E-02	2.03E-02	1.19E-03
Chlorobenzene	108-90-7	1.55E-02	1.07E-01	3.00E-02	1.09E-01	2.17E-01	8.00E-02	3.50E-02	9.50E-02	--
Chloroform	67-66-3	--	--	--	1.17E-02	--	--	--	--	2.09E-03
Ethylbenzene	100-41-4	--	--	4.19E-02	--	--	--	--	--	--
Naphthalene	91-20-3	8.60E-03	4.63E-02	5.07E-02	4.30E-03	--	--	--	--	--
Tetrachloroethene	127-18-4	--	4.10E-03	--	--	--	--	--	--	--
Toluene	108-88-3	--	2.24E-01	--	--	--	--	--	--	--
Trichloroethene	79-01-6	--	2.62E-02	--	6.49E-03	--	2.36E-02	--	--	--
Vinyl chloride	75-01-4	--	1.30E-03	--	--	3.07E-02	7.59E-03	--	--	--

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
RME - Reasonable Maximum Exposure.
(a) Concentration in groundwater (mg/L) x groundwater to air attenuation factor (L/m^3)

TABLE L-5
EXPOSURE POINT CONCENTRATIONS (MLE) - EXCAVATION AIR, VOLATILIZATION FROM GROUNDWATER
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	CAS Number	Fill Area Excavation Air EPCs (mg/m3) (a)								
		G		H		I				L
		EE-05	EEG-107	EE-01	EE-02	AA-I-S1	AA-I-S2	EE-12	EE-14	EEG-109
1,1,2,2-Tetrachloroethane	79-34-5	--	--	2.80E-04	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	--	1.25E-01	--	--	--	--	--	--	--
Benzene	71-43-2	2.98E-03	1.00E-01	4.06E-02	6.09E-02	1.23E-02	1.66E-03	1.84E-02	2.03E-02	1.19E-03
Chlorobenzene	108-90-7	1.55E-02	1.07E-01	3.00E-02	1.09E-01	1.29E-01	4.14E-02	3.50E-02	9.49E-02	--
Chloroform	67-66-3	--	--	--	1.16E-02	--	--	--	--	2.08E-03
Ethylbenzene	100-41-4	--	--	4.19E-02	--	--	--	--	--	--
Naphthalene	91-20-3	8.51E-03	4.58E-02	5.02E-02	4.26E-03	--	--	--	--	--
Tetrachloroethene	127-18-4	--	4.10E-03	--	--	--	--	--	--	--
Toluene	108-88-3	--	2.24E-01	--	--	--	--	--	--	--
Trichloroethene	79-01-6	--	2.62E-02	--	6.48E-03	--	1.36E-02	--	--	--
Vinyl chloride	75-01-4	--	1.30E-03	--	--	2.32E-02	6.32E-03	--	--	--

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
MLE - Most Likely Exposure.
(a) Excavation air concentration (mg/l) = groundwater concentration (mg/l) x groundwater-to-air attenuation factor (l/m^3).

APPENDIX M

CALCULATION OF OUTDOOR AIR VOC CONCENTRATIONS FROM GROUNDWATER

APPENDIX M
CALCULATION OF OUTDOOR AIR VOC CONCENTRATIONS FROM GROUNDWATER

Ambient air concentrations resulting from migration of volatile constituents of potential concern (COPC) from underlying groundwater to outdoor air were predicted based on the method recommended by the American Society for Testing and Materials in ASTM PS-104 *Standard Provisional Guide for Risk-Based Corrective Action* (ASTM, 1998). Calculations were completed using the *RBCA Tool Kit for Chemical Releases* software designed by Groundwater Services, Inc. (1999) to implement the calculations recommended in ASTM PS-104. The goal of the approach recommended in ASTM PS-104 is to estimate potential impacts of volatile constituents migrating from groundwater to the outdoor air-breathing zone.

The approach recommend in ASTM PS-104 for predicting migration of COPC vapors from groundwater to ambient outdoor air is a simple one in which the relationship between outdoor air and dissolved groundwater concentrations is represented by a chemical-specific groundwater volatilization factor, and is dependent upon the following assumptions:

- The concentration of dissolved constituents in groundwater remains constant over time (i.e., serves as an infinite source of volatile constituents).
- The soil vapor concentrations of volatile constituents reach immediate equilibrium with the dissolved concentration of these same constituents in groundwater.
- There is no loss of constituent (through biodegradation, or other loss mechanism) as the volatile constituent migrates, via diffusion, to the ground surface.
- Air dispersion of volatile constituents within the breathing zone is predicted through the use of a box model resulting in steady, well mixed atmospheric dispersion of volatile constituents as they rise into the breathing zone.

Equations for the implementation of ASTM PS-104 are available in the American Society for Testing and Materials in ASTM PS-104 *Standard Provisional Guide for Risk-Based Corrective Action* (ASTM, 1998) and the *RBCA Tool Kit Chemical Releases Guidance Manual* developed by GSI (1998). Chemical-specific parameters selected by GSI for use in their *RBCA Tool Kit for Chemical Releases* software were utilized in this risk assessment.

Site-specific soil and groundwater parameters incorporated in this evaluation, and summarized in the attached modeling printouts, included:

- depth to groundwater (cm);
- width of source zone area (cm); and

- vadose zone thickness (cm) (site-specific, dependent on depth to groundwater and capillary zone thickness).

Based on similarities to limited site-specific data for the characterization of surface soil (summarized in Table M-1), several default parameters assumed to best describe site soil (sandy silt) (IEPA, 1998; and GSI, 1999) were selected for inclusion in this evaluation. They include:

- total soil porosity;
- volumetric water content of vadose zone;
- volumetric water content of capillary fringe;
- volumetric air content of vadose zone;
- volumetric air content capillary fringe;
- dry bulk density;
- vertical hydraulic conductivity;
- vapor permeability; and
- capillary zone thickness.

[Note: Soil type designations available in the Johnson and Ettinger Model (Appendix K) and the RBCA model are different. Based on consultation with soil scientists, silt loam was identified as the most appropriate soil classification for the Johnson and Ettinger model and sandy silt was identified as the most appropriate soil classification for the RBCA model.]

The modeling printouts are presented in the following order:

<u>RME OUTDOOR AIR CONCENTRATIONS</u>

- Fill Area G, EE-05
- Fill Area G, EEG-107
- Fill Area H, EE-01
- Fill Area H, EE-02
- Fill Area I, AA-I-S1
- Fill Area I, AA-I-S2
- Fill Area I, EE-12
- Fill Area I, EE-14

- Fill Area L, EEG-109

MLE INDOOR AIR CONCENTRATIONS

- Fill Area G
- Fill Area H
- Fill Area I
- Fill Area L

REFERENCES:

ASTM, 1998. Standard Provisional Guidance for Risk Based Corrective Action. ASTM Designation: PS 104-98. American Society for Testing and Material. West Conshohocken, PA.

GSI, 1998. RBCA Tool Kit for Chemical Releases Guidance Manual. Groundwater Services, Inc. Houston, Texas.

GSI, 1999. RBCA Tool Kit for Chemical Releases Software. Groundwater Services, Inc. Houston, Texas.

IEPA, 1998. Tiered Approach to Corrective Action Objectives. Title 35, Subtitle G, Chapter I, Subchapter J, Part 742. As amended June 8, 1998. Illinois Environmental Protection Agency.

TABLE M-1
COMPARISON OF SOIL PARAMETERS
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Parameter	Site-Specific Data for Surface Soil (a)				Values Used In Modeling	
	Fill Area G	Fill Area H	Fill Area I	Fill Area L		
Total Soil Porosity (unitless)	3.70E-01	4.30E-01	2.80E-01	4.30E-01	4.30E-01	(b)
Volumetric Water Content - Vadose Zone (unitless)	1.50E-01	5.20E-02	5.10E-02	5.30E-02	3.00E-01	(b)
Volumetric Water Content - Capillary Fringe (unitless)	NA	NA	NA	NA	3.87E-01	(c)
Volumetric Air Content - Vadose Zone (unitless)	2.20E-01	3.78E-01	2.29E-01	3.77E-01	1.30E-01	(b)
Volumetric Air Content - Capillary Fringe (unitless)	NA	NA	NA	NA	4.30E-02	(d)
Dry Bulk Density (kg/L)	1.69E+00	1.36E+00	1.93E+00	1.31E+00	1.50E+00	(b)
Vertical Hydraulic Conductivity (cm/d)	NA	NA	NA	NA	8.60E-01	(e)
Vapor Permeability (cm^2)	NA	NA	NA	NA	1.00E-11	(e)
Capillary Zone Thickness (cm)	NA	NA	NA	NA	1.10E+01	(e)
Depth to Groundwater (cm)	EE-05: 540 EEG-107: 491	442	506	466	SS	
Groundwater Plume Width at Source (cm)	9906	15240	42672	6096	SS	

Notes:
NA - Not Available
SS = Site-Specific
(a) Average of values by Fill Area in the Sauget Area 1 EE/CA and RI/FS Data Report.
(b) Default for Subsurface Soil (IEPA, 1998).
(c) Assumed to be 90% of total soil porosity.
(d) Assumed to be 10% of total soil porosity.
(e) Default for sandy silt (GSI, 1999).

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ **(CHECKED IF PATHWAY IS ACTIVE)**

GROUNDWATER: VAPOR INHALATION

Exposure Concentration

	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Outdoor Air: POE Conc. (mg/m^3) (1) / (2)		
Constituents of Concern	Groundwater Conc. (mg/L)	On-site (0 cm) Commercial	Off-site 1 (0 cm) #VALUE!	Off-site 2 (0 cm) #VALUE!	On-site (0 cm) Commercial	Off-site 1 (0 cm) #VALUE!	Off-site 2 (0 cm) #VALUE!
Tetrachloroethane, 1,1,2,2-	0.0E+0	8.5E+4			0.0E+0		
Methyl-2-pentanone, 4-	0.0E+0	1.5E+5			0.0E+0		
Benzene	1.1E-1	2.9E+4			3.8E-6		
Chlorobenzene	6.2E-1	4.9E+4			1.3E-5		
Chloroform	0.0E+0	3.8E+4			0.0E+0		
Ethylbenzene	0.0E+0	2.5E+4			0.0E+0		
Naphthalene	3.9E-1	3.3E+5			1.2E-6		
Tetrachloroethene	0.0E+0	1.2E+4			0.0E+0		
Toluene	0.0E+0	2.7E+4			0.0E+0		
Trichloroethene	0.0E+0	1.3E+4			0.0E+0		
Vinyl chloride	0.0E+0	1.9E+3			0.0E+0		

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name: Sauget Area 1
Site Location: Sauget Illinois
Completed By: Marcus

Date Completed: 15-Nov-00
Job ID: EE-05

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ **(CHECKED IF PATHWAY IS ACTIVE)**

GROUNDWATER: VAPOR INHALATION

Exposure Concentration

	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Outdoor Air. POE Conc. (mg/m^3) (1) / (2)		
Constituents of Concern	Groundwater Conc. (mg/L)	On-site (0 cm) Commercial	Off-site 1 (0 cm) None	Off-site 2 (0 cm) None	On-site (0 cm) Commercial	Off-site 1 (0 cm) None	Off-site 2 (0 cm) None
Tetrachloroethane, 1,1,2,2-	0.0E+0	7.9E+4			0.0E+0		
Methyl-2-pentanone, 4-	1.3E+0	1.4E+5			9.5E-6		
Benzene	3.7E+0	2.7E+4			1.4E-4		
Chlorobenzene	4.3E+0	4.5E+4			9.5E-5		
Chloroform	0.0E+0	3.6E+4			0.0E+0		
Ethylbenzene	0.0E+0	2.4E+4			0.0E+0		
Naphthalene	2.1E+0	3.0E+5			6.9E-6		
Tetrachloroethene	1.7E-1	1.1E+4			1.5E-5		
Toluene	8.5E+0	2.5E+4			3.4E-4		
Trichloroethene	2.0E-1	1.2E+4			1.7E-5		
Vinyl chloride	4.1E-2	1.8E+3			2.3E-5		

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name: Sauget Area 1
Site Location: Sauget Illinois
Completed By: Marcus

Date Completed: 15-Nov-00
Job ID: EEG-107

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ **(CHECKED IF PATHWAY IS ACTIVE)**

GROUNDWATER: VAPOR INHALATION

Exposure Concentration

	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Outdoor Air: POE Conc. (mg/m^3) (1) / (2)		
Constituents of Concern	Groundwater Conc. (mg/L)	On-site (0 cm) Commercial	Off-site 1 (0 cm) None	Off-site 2 (0 cm) None	On-site (0 cm) Commercial	Off-site 1 (0 cm) None	Off-site 2 (0 cm) None
Tetrachloroethane, 1,1,2,2-	1.2E-2	4.7E+4			2.5E-7		
Methyl-2-pentanone, 4-	0.0E+0	8.0E+4			0.0E+0		
Benzene	1.5E+0	1.6E+4			9.1E-5		
Chlorobenzene	1.2E+0	2.7E+4			4.4E-5		
Chloroform	0.0E+0	2.1E+4			0.0E+0		
Ethylbenzene	1.8E+0	1.4E+4			1.2E-4		
Naphthalene	2.3E+0	1.8E+5			1.3E-5		
Tetrachloroethene	0.0E+0	7.0E+3			0.0E+0		
Toluene	0.0E+0	1.5E+4			0.0E+0		
Trichloroethene	0.0E+0	7.0E+3			0.0E+0		
Vinyl chloride	0.0E+0	1.1E+3			0.0E+0		

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name: Sauget Area 1
Site Location: Sauget Illinois
Completed By: Marcus

Date Completed: 15-Nov-00
Job ID: EE-01

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ **(CHECKED IF PATHWAY IS ACTIVE)**

GROUNDWATER: VAPOR INHALATION

Exposure Concentration

	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Outdoor Air: POE Conc. (mg/m^3) (1) / (2)		
Constituents of Concern	Groundwater Conc. (mg/L)	On-site (0 cm) Commercial	Off-site 1 (0 cm) None	Off-site 2 (0 cm) None	On-site (0 cm) Commercial	Off-site 1 (0 cm) None	Off-site 2 (0 cm) None
Tetrachloroethane, 1,1,2,2-	0.0E+0	4.7E+4			0.0E+0		
Methyl-2-pentanone, 4-	0.0E+0	8.0E+4			0.0E+0		
Benzene	2.3E+0	1.6E+4			1.4E-4		
Chlorobenzene	4.4E+0	2.7E+4			1.6E-4		
Chloroform	4.3E-1	2.1E+4			2.0E-5		
Ethylbenzene	0.0E+0	1.4E+4			0.0E+0		
Naphthalene	2.0E-1	1.8E+5			1.1E-6		
Tetrachloroethene	0.0E+0	7.0E+3			0.0E+0		
Toluene	0.0E+0	1.5E+4			0.0E+0		
Trichloroethene	5.0E-2	7.0E+3			7.0E-6		
Vinyl chloride	0.0E+0	1.1E+3			0.0E+0		

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name: Sauget Area 1
Site Location: Sauget Illinois
Completed By: Marcus

Date Completed: 15-Nov-00
Job ID: EE-02

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ **(CHECKED IF PATHWAY IS ACTIVE)**

GROUNDWATER: VAPOR INHALATION

	Exposure Concentration						
	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Outdoor Air: POE Conc. (mg/m^3) (1) / (2)		
Constituents of Concern	Groundwater Conc. (mg/L)	On-site (0 cm) Commercial	Off-site 1 (0 cm) #VALUE!	Off-site 2 (0 cm) #VALUE!	On-site (0 cm) Commercial	Off-site 1 (0 cm) #VALUE!	Off-site 2 (0 cm) #VALUE!
Tetrachloroethane, 1,1,2,2-	0.0E+0	1.9E+4			0.0E+0		
Methyl-2-pentanone, 4-	0.0E+0	3.3E+4			0.0E+0		
Benzene	6.2E-1	6.4E+3			9.6E-5		
Chlorobenzene	8.7E+0	1.1E+4			8.1E-4		
Chloroform	0.0E+0	8.4E+3			0.0E+0		
Ethylbenzene	0.0E+0	5.6E+3			0.0E+0		
Naphthalene	0.0E+0	7.3E+4			0.0E+0		
Tetrachloroethene	0.0E+0	2.7E+3			0.0E+0		
Toluene	0.0E+0	6.0E+3			0.0E+0		
Trichloroethene	0.0E+0	2.8E+3			0.0E+0		
Vinyl chloride	9.7E-1	4.2E+2			2.3E-3		

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name: Sauget Area 1
Site Location: Sauget Illinois
Completed By: Marcus

Date Completed: 15-Nov-00
Job ID: AA-I-S1

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ **(CHECKED IF PATHWAY IS ACTIVE)**

GROUNDWATER: VAPOR INHALATION

Exposure Concentration

Constituents of Concern	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Outdoor Air: POE Conc. (mg/m^3) (1) / (2)		
	Groundwater Conc. (mg/L)	On-site (0 cm) Commercial	Off-site 1 (0 cm) #VALUE!	Off-site 2 (0 cm) #VALUE!	On-site (0 cm) Commercial	Off-site 1 (0 cm) #VALUE!	Off-site 2 (0 cm) #VALUE!
Tetrachloroethane, 1,1,2,2-	0.0E+0	1.9E+4			0.0E+0		
Methyl-2-pentanone, 4-	0.0E+0	3.3E+4			0.0E+0		
Benzene	1.2E-1	6.4E+3			1.9E-5		
Chlorobenzene	3.2E+0	1.1E+4			3.0E-4		
Chloroform	0.0E+0	8.4E+3			0.0E+0		
Ethylbenzene	0.0E+0	5.6E+3			0.0E+0		
Naphthalene	0.0E+0	7.3E+4			0.0E+0		
Tetrachloroethene	0.0E+0	2.7E+3			0.0E+0		
Toluene	0.0E+0	6.0E+3			0.0E+0		
Trichloroethene	1.8E-1	2.8E+3			6.4E-5		
Vinyl chloride	2.4E-1	4.2E+2			5.7E-4		

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name: Sauget Area 1
Site Location: Sauget Illinois
Completed By: Marcus

Date Completed: 15-Nov-00
Job ID: AA-I-S2

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAY IS ACTIVE)

GROUNDWATER: VAPOR INHALATION

	Exposure Concentration						
	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Outdoor Air: POE Conc. (mg/m^3) (1) / (2)		
Constituents of Concern	Groundwater Conc. (mg/L)	On-site (0 cm) Commercial	Off-site 1 (0 cm) #VALUE!	Off-site 2 (0 cm) #VALUE!	On-site (0 cm) Commercial	Off-site 1 (0 cm) #VALUE!	Off-site 2 (0 cm) #VALUE!
Tetrachloroethane, 1,1,2,2-	0.0E+0	1.9E+4			0.0E+0		
Methyl-2-pentanone, 4-	0.0E+0	3.3E+4			0.0E+0		
Benzene	6.8E-1	6.4E+3			1.1E-4		
Chlorobenzene	1.4E+0	1.1E+4			1.3E-4		
Chloroform	0.0E+0	8.4E+3			0.0E+0		
Ethylbenzene	0.0E+0	5.6E+3			0.0E+0		
Naphthalene	0.0E+0	7.3E+4			0.0E+0		
Tetrachloroethene	0.0E+0	2.7E+3			0.0E+0		
Toluene	0.0E+0	6.0E+3			0.0E+0		
Trichloroethene	0.0E+0	2.8E+3			0.0E+0		
Vinyl chloride	0.0E+0	4.2E+2			0.0E+0		

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name: Sauget Area 1
Site Location: Sauget Illinois
Completed By: Marcus

Date Completed: 15-Nov-00
Job ID: EE-12

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ **(CHECKED IF PATHWAY IS ACTIVE)**

GROUNDWATER: VAPOR INHALATION

Exposure Concentration

	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Outdoor Air: POE Conc. (mg/m^3) (1) / (2)		
Constituents of Concern	Groundwater Conc. (mg/L)	On-site (0 cm) Commercial	Off-site 1 (0 cm) #VALUE!	Off-site 2 (0 cm) #VALUE!	On-site (0 cm) Commercial	Off-site 1 (0 cm) #VALUE!	Off-site 2 (0 cm) #VALUE!
Tetrachloroethane, 1,1,2,2-	0.0E+0	1.9E+4			0.0E+0		
Methyl-2-pentanone, 4-	0.0E+0	3.3E+4			0.0E+0		
Benzene	7.5E-1	6.4E+3			1.2E-4		
Chlorobenzene	3.8E+0	1.1E+4			3.5E-4		
Chloroform	0.0E+0	8.4E+3			0.0E+0		
Ethylbenzene	0.0E+0	5.6E+3			0.0E+0		
Naphthalene	0.0E+0	7.3E+4			0.0E+0		
Tetrachloroethene	0.0E+0	2.7E+3			0.0E+0		
Toluene	0.0E+0	6.0E+3			0.0E+0		
Trichloroethene	0.0E+0	2.8E+3			0.0E+0		
Vinyl chloride	0.0E+0	4.2E+2			0.0E+0		

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name: Sauget Area 1
Site Location: Sauget Illinois
Completed By: Marcus

Date Completed: 15-Nov-00
Job ID: EE-14

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ **(CHECKED IF PATHWAY IS ACTIVE)**

GROUNDWATER: VAPOR INHALATION

Exposure Concentration

Constituents of Concern	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Outdoor Air: POE Conc. (mg/m^3) (1) / (2)		
	Groundwater Conc. (mg/L)	On-site (0 cm) Commercial	Off-site 1 (0 cm) None	Off-site 2 (0 cm) None	On-site (0 cm) Commercial	Off-site 1 (0 cm) None	Off-site 2 (0 cm) None
Tetrachloroethane, 1,1,2,2-	0.0E+0	1.2E+5			0.0E+0		
Methyl-2-pentanone, 4-	0.0E+0	2.1E+5			0.0E+0		
Benzene	4.4E-2	4.3E+4			1.0E-6		
Chlorobenzene	0.0E+0	7.1E+4			0.0E+0		
Chloroform	7.6E-2	5.6E+4			1.4E-6		
Ethylbenzene	0.0E+0	3.7E+4			0.0E+0		
Naphthalene	0.0E+0	4.7E+5			0.0E+0		
Tetrachloroethene	0.0E+0	1.8E+4			0.0E+0		
Toluene	0.0E+0	4.0E+4			0.0E+0		
Trichloroethene	0.0E+0	1.8E+4			0.0E+0		
Vinyl chloride	0.0E+0	2.8E+3			0.0E+0		

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name: Sauget Area 1
Site Location: Sauget Illinois
Completed By: Marcus

Date Completed: 15-Nov-00
Job ID: EEG-109

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ **(CHECKED IF PATHWAY IS ACTIVE)**

GROUNDWATER: VAPOR INHALATION

Exposure Concentration

	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Outdoor Air: POE Conc. (mg/m^3) (1) / (2)		
Constituents of Concern	Groundwater Conc. (mg/L)	On-site (0 cm) Commercial	Off-site 1 (0 cm) None	Off-site 2 (0 cm) None	On-site (0 cm) Commercial	Off-site 1 (0 cm) None	Off-site 2 (0 cm) None
Tetrachloroethane, 1,1,2,2-	0.0E+0	8.4E+4			0.0E+0		
Methyl-2-pentanone, 4-	1.4E-1	1.5E+5			9.4E-7		
Benzene	3.5E-1	2.9E+4			1.2E-5		
Chlorobenzene	4.7E-1	4.8E+4			9.7E-6		
Chloroform	0.0E+0	3.8E+4			0.0E+0		
Ethylbenzene	0.0E+0	2.5E+4			0.0E+0		
Naphthalene	2.3E-1	3.3E+5			7.0E-7		
Tetrachloroethene	2.1E-2	1.2E+4			1.7E-6		
Toluene	8.6E-1	2.7E+4			3.2E-5		
Trichloroethene	2.1E-2	1.3E+4			1.6E-6		
Vinyl chloride	8.6E-3	1.9E+3			4.6E-6		

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name: Sauget Area 1
Site Location: Sauget Illinois
Completed By: Angela

Date Completed: 1-Dec-00
Job ID: MLE:Area G

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ **(CHECKED IF PATHWAY IS ACTIVE)**

GROUNDWATER: VAPOR INHALATION

Exposure Concentration

Constituents of Concern	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Outdoor Air: POE Conc. (mg/m^3) (1) / (2)		
	Groundwater Conc. (mg/L)	On-site (0 cm) Commercial	Off-site 1 (0 cm) None	Off-site 2 (0 cm) None	On-site (0 cm) Commercial	Off-site 1 (0 cm) None	Off-site 2 (0 cm) None
Tetrachloroethane, 1,1,2,2-	5.7E-3	1.0E+5			5.5E-8		
Methyl-2-pentanone, 4-	0.0E+0	1.9E+5			0.0E+0		
Benzene	9.4E-1	3.5E+4			2.7E-5		
Chlorobenzene	1.4E+0	5.9E+4			2.4E-5		
Chloroform	1.2E-1	4.6E+4			2.6E-6		
Ethylbenzene	5.0E-1	3.0E+4			1.7E-5		
Naphthalene	6.3E-1	4.2E+5			1.5E-6		
Tetrachloroethene	0.0E+0	1.4E+4			0.0E+0		
Toluene	0.0E+0	3.2E+4			0.0E+0		
Trichloroethene	2.0E-2	1.6E+4			1.2E-6		
Vinyl chloride	0.0E+0	2.2E+3			0.0E+0		

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name: Sauget Area 1
Site Location: Sauget Illinois
Completed By: Angela

Date Completed: 1-Dec-00
Job ID: MLE:Area H

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ **(CHECKED IF PATHWAY IS ACTIVE)**

GROUNDWATER: VAPOR INHALATION

Exposure Concentration

Constituents of Concern	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Outdoor Air: POE Conc. (mg/m^3) (1) / (2)		
	Groundwater Conc. (mg/L)	On-site (0 cm) Commercial	Off-site 1 (0 cm) None	Off-site 2 (0 cm) None	On-site (0 cm) Commercial	Off-site 1 (0 cm) None	Off-site 2 (0 cm) None
Tetrachloroethane, 1,1,2,2-	0.0E+0	1.1E+5			0.0E+0		
Methyl-2-pentanone, 4-	0.0E+0	2.0E+5			0.0E+0		
Benzene	2.8E-1	3.5E+4			7.9E-6		
Chlorobenzene	1.7E+0	6.0E+4			2.9E-5		
Chloroform	0.0E+0	4.7E+4			0.0E+0		
Ethylbenzene	0.0E+0	3.1E+4			0.0E+0		
Naphthalene	0.0E+0	4.3E+5			0.0E+0		
Tetrachloroethene	0.0E+0	1.5E+4			0.0E+0		
Toluene	0.0E+0	3.3E+4			0.0E+0		
Trichloroethene	3.2E-2	1.7E+4			1.9E-6		
Vinyl chloride	1.6E-1	2.2E+3			7.1E-5		

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name: Sauget Area 1
Site Location: Sauget Illinois
Completed By: Angela

Date Completed: 1-Dec-00
Job ID: MLE:Area I

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ **(CHECKED IF PATHWAY IS ACTIVE)**

GROUNDWATER: VAPOR INHALATION

Exposure Concentration

	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Outdoor Air: POE Conc. (mg/m^3) (1) / (2)		
Constituents of Concern	Groundwater Conc. (mg/L)	On-site (0 cm) Commercial	Off-site 1 (0 cm) None	Off-site 2 (0 cm) None	On-site (0 cm) Commercial	Off-site 1 (0 cm) None	Off-site 2 (0 cm) None
Tetrachloroethane, 1,1,2,2-	0.0E+0	7.6E+4			0.0E+0		
Methyl-2-pentanone, 4-	0.0E+0	1.3E+5			0.0E+0		
Benzene	7.8E-3	2.6E+4			3.0E-7		
Chlorobenzene	0.0E+0	4.4E+4			0.0E+0		
Chloroform	1.5E-2	3.5E+4			4.3E-7		
Ethylbenzene	0.0E+0	2.3E+4			0.0E+0		
Naphthalene	0.0E+0	2.9E+5			0.0E+0		
Tetrachloroethene	0.0E+0	1.1E+4			0.0E+0		
Toluene	0.0E+0	2.5E+4			0.0E+0		
Trichloroethene	0.0E+0	1.1E+4			0.0E+0		
Vinyl chloride	0.0E+0	1.8E+3			0.0E+0		

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name: Sauget Area 1
Site Location: Sauget Illinois
Completed By: Angela

Date Completed: 1-Dec-00
Job ID: MLE:Area L

APPENDIX N

CALCULATION OF PRODUCE CONCENTRATIONS

APPENDIX N
CALCULATION OF PRODUCE CONCENTRATIONS

Constituents of potential concern (COPCs) in soil may enter plants through root uptake where they may accumulate in the below ground portion of the plants (e.g., root, tuber, bulb) and or be transported via transpiration to the above-ground shoots and fruits.

For above and below ground produce, plant COPC concentrations may be predicted from soil COPC concentrations through application of a model, recommended by the USEPA (1998) for conducting multipathway human health risk assessment at combustion facilities, which is dependent upon a simple soil-to-plant biotransfer factor (Br). The equation for implementing this model is:

Produce Concentration (mg/kg DW) = Cs x Br

Where:

C_s = Concentration of COPC in Soil (mg/kg) (in this risk assessment C_s = the surface soil exposure point concentration selected for evaluation of residential exposure scenarios)

Br = Plant-soil Bioconcentration Factor for Produce [(mg/kg DW Plant)/(mg/kg soil)] (plant-soil bioconcentration factors are available for both above and below ground produce)

COPCs in transect soils include arsenic, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-c,d)pyrene, and dieldrin. For organic constituents, root uptake factors are calculated as a function of log K_{ow}. The relationship between log K_{ow} and the root uptake factor is linear up to approximately a log K_{ow} of 4 (Travis and Arms, 1988). Above this value, the linear relationship no longer holds. For the organic COPCs identified in transect soils, the log K_{ow} values are as follows (USEPA, 1998):

benzo(a)anthracene	5.68
benzo(a)pyrene	6.13
benzo(b)fluoranthene	6.20
dibenzo(a,h)anthracene	6.55
Indeno(1,2,3-cd)pyrene	6.91
Dieldrin	5.27

These values are outside of the linear range, and there are no specific data in the literature for reliably quantifying plant uptake of these constituents.

For the limited data on PAHs that are in the literature, it is unclear what component of the plant concentration is due to soil uptake and what component is due to atmospheric depositions; PAHs are common in the environment due to the combustion of fossil fuels. Moreover, below-ground to above-ground constituent transfer within plants is dependent upon the process of transpiration. For organics with low solubilities, this is likely to be a negligible transfer process. Because all of this leads to great uncertainty in the plant uptake for high log K_{ow} organics, these constituents were not quantitatively evaluated in the produce pathway in the HHRA.

The attached modeling printouts, Tables N-1 and N-2, summarize the inputs and results for prediction of above and below ground produce concentrations used in evaluating the RME and MLE residential exposure scenarios.

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Travis, C.C. and A.D. Arms. 1988. Bioconcentration of Organics in Beef, Milk, and Vegetation. Health and Safety Research Division, Oak Ridge National Laboratory, Oak Ridge, TN. Env. Sci. Technol., Vol. 22, No. 3.

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TABLE N-1
EXPOSURE POINT CONCENTRATIONS (RME) - PRODUCE GROWN IN TRANSECT SOILS
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

		Constituent Specific Inputs for Prediction of Produce Concentrations (a)			Transect 7 Predicted Produce Concentrations	
Constituent	CAS Number	Log Kow	Br_{ag}	$Br_{rootveg}$	Above Ground (mg/kg FW)	Below Ground (mg/kg FW)
Arsenic	7440-38-2	NA	6.33E-03	8.00E-03	1.42E-02	1.80E-02

Notes:
-- - Not a COPC in this area/medium.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EPC - Exposure Point Concentration.
FW - Fresh Weight
NA - Not Applicable.
RME - Reasonable Maximum Exposure.
(a) USEPA, 1998d. Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities. Volume Two. Appendix A. United States Environmental Protection Agency. Solid Waste and Emergency Response. EPA530-D-98-001B. July 1998. Calculations discussed in Appendix N.
(b) USEPA, 1998. Methodology for Assessing Health Risks Associated with Multiple Pathways of Exposure to Combustor Emissions. USEPA National Center for Environmental Assessment. EPA600/R-98/137.
Above Ground Produce Concentration = C_s x Br_{ag} x 0.15, where vegetable moisture content is assumed to be an average 85% (b).
Below Ground Produce Concentration = C_s x $Br_{rootveg}$ x 0.15, where vegetable moisture content is assumed to be an average 85% (b).
C_s = Concentration of constituent in soil.
Br_{ag} = Plant-soil bioconcentration factor for above ground produce.
$Br_{rootveg}$ = Plant-soil bioconcentration factor for below ground produce.

TABLE N-2
EXPOSURE POINT CONCENTRATIONS (MLE)- PRODUCE GROWN IN TRANSECT SOILS
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	CAS Number	Constituent Specific Inputs for Prediction of Produce Concentrations (a)			Transect 7 Predicted Produce Concentrations	
		Log Kow	Br_{ag}	$Br_{rootveg}$	Above Ground (mg/kg DW)	Below Ground (mg/kg DW)
Arsenic	7440-38-2	NA	6.33E-03	8.00E-03	9.49E-03	1.20E-02

Notes:
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
FW - Fresh Weight.
EPC - Exposure Point Concentration.
MLE - Most Likely Exposure.
NA - Not Applicable.
(a) USEPA, 1998d. Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities. Volume Two. Appendix A. United States Environmental Protection Agency. Solid Waste and Emergency Response. EPA530-D-98-001B. July 1998. Calculations discussed in Appendix N.
(b) USEPA, 1998. Methodology for Assessing Health Risks Associated with Multiple Pathways of Exposure to Combustor Emissions. USEPA National Center for Environmental Assessment. EPA600/R-98/137.
Above Ground Produce Concentration = C_s x Br_{ag} x 0.15, where vegetable moisture content is assumed to be an average 85% (b).
Below Ground Produce Concentration = C_s x $Br_{rootveg}$ x 0.15, where vegetable moisture content is assumed to be an average 85% (b).
C_s = Concentration of constituent in soil.
Br_{ag} = Plant-soil bioconcentration factor for above ground produce.
$Br_{rootveg}$ = Plant-soil bioconcentration factor for below ground produce.

APPENDIX O

ABSORPTION ADJUSTMENT FACTORS (AAFs)

APPENDIX O
ABSORPTION ADJUSTMENT FACTORS (AAFs)

Bioavailability is the measure of the degree to which a chemical may be systemically absorbed following exposure. In accordance with USEPA guidance (USEPA, 1989, 1992), absorption adjustment factors (AAFs) for bioavailability will be used in conducting this risk evaluation. To estimate the potential risk to human health that may be posed by the presence of constituents of potential concern (COPC) in various environmental media (such as soil, sediment, water or air), it is first necessary to estimate the human exposure dose of each chemical. The exposure dose is then combined with an estimate of the toxicity of the chemical to produce an estimate of risk posed to human health.

The estimate of toxicity of a chemical, termed the toxicity value, can be derived from human epidemiological data, but it is most often derived from experiments with laboratory animals. The toxicity value can be calculated based on the administered dose of the chemical (similar to the human exposure dose) or, when data are available, based on the absorbed dose, or internal dose, of the chemical.

In animals, as in humans, the administered dose of a chemical is not necessarily completely absorbed. Moreover, differences in absorption exist between laboratory animals and humans, as well as between different media and routes of exposure. Therefore, it is not always appropriate to directly apply a toxicity value to the human exposure dose. In many cases, a correction factor in the calculation of risk is needed to account for differences between absorption in the toxicity study and absorption likely to occur upon human exposure to a chemical. Without such a correction, the estimate of human health risk could be over- or under-estimated.

This correction factor is termed the absorption adjustment factor, or AAF. The AAF is used to adjust the human exposure dose so that it is expressed in the same terms as the doses used to generate the dose-response curve in the dose-response study. The AAF is the ratio between the estimated human absorption for the specific medium and route of exposure, and the known or estimated absorption for the laboratory study from which the dose-response value was derived.

$$\mathbf{AAFs} = \frac{\textbf{fraction absorbed in humans for the environmental exposure}}{\textbf{fraction absorbed in the dose - response study}}$$

The use of an AAF allows appropriate adjustments to be made to the administered dose of a chemical when the efficiency of absorption between environmental exposure and experimental exposure is known or expected to differ because of physiological effects and/or matrix or vehicle effects.

AAFs can have numerical values less than one or greater than one. When the toxicity curve is based on administered dose data, and if it is estimated that the fraction absorbed from the site-specific exposure or medium is the same as the fraction absorbed in the laboratory study, then the AAF is 1.0. This does not mean that there is 100% absorption, only that the magnitude of absorption is the same in both cases. There are situations in which it is expected that the fraction absorbed from a site-related exposure would be higher than that in the laboratory study. There are also situations where the reverse could occur. Thus, use of AAFs provides more accurate and more realistic estimates of potential human health risk. In the absence of detailed toxicological information on a COPC, the following default AAF values are generally employed. A default AAF value of 0.01 is used for dermal exposure to organics, a value of 0.001 is used for dermal exposure to inorganics, and a value of 1.0 is employed for all other routes of exposure.

Support for the Use of AAFs in Agency Guidance

The use of absorption factors is recommended by USEPA for use in risk assessment when the "medium of exposure in the site exposure assessment differs from the medium of exposure assumed by the toxicity value" (USEPA, 1989). In more recent guidance (USEPA, 1992), USEPA states:

> The applied dose, or the amount that reaches exchange boundaries of the skin, lung or gastrointestinal tract, may often be less than the potential dose if the material is only partly bioavailable. Where data on bioavailability are known, adjustments to the potential dose to convert it to applied dose and internal dose may be made.
>
> This may be done by adding a bioavailability factor (range: 0 to 1) to the dose equation. The bioavailability factor would then take into account the ability of the chemical to be extracted from the matrix, absorption through the exchange boundary, and any other losses between ingestion and contact with lung or gastrointestinal tract.

Oral Bioavailability of Chemicals in Soil

Oral bioavailability is a measure of the degree to which a chemical may be systemically absorbed following ingestion. Some chemicals are absorbed almost completely (100 percent bioavailability) when ingested in pure form. Other chemicals may pass through the body largely unabsorbed. In part, the physical characteristics of the chemical affect the amount absorbed. In general, as the lipophilicity of a chemical increases, its absorption across the gastrointestinal tract increases.

In addition, the oral bioavailability or absorption of soil-bound chemicals is also dependent upon the rate at which chemicals dissociate from the soil or slag matrix in the gut. Soil-bound chemicals, particularly inorganics, are usually absorbed to a lesser degree than chemicals in pure form (Paustenbach, 1987; Goon et al., 1990, 1991; Sheehan et al., 1991; Sheppard et al., 1995, Magee et al., 1996). The reduced absorption is a result of hydrophobic attraction between the chemical and soil matrix. The greater the degree of affinity between a chemical and soil, the less likely that a soil-bound chemical will be absorbed upon ingestion. Absorption of the pure chemical in the gut is inherently evaluated in the USEPA reference doses and oral cancer slope factors as each is based on oral animal or human toxicity studies. Therefore, bioavailability, as used in this Risk Evaluation, refers to the "bioaccessibility" of the chemicals from the soil or slag matrix and represents the difference in absorption between chemicals in soil and chemicals in a pure (100 percent bioaccessible) form. Because the COPCs may be tightly bound in the slag and/or soil matrix at the site due to the process in which they were produced and "aging" of the chemicals over time, bioaccessibility may vary among the COPCs and is probably much less than 100%. However, due to the lack of site-specific data, the degree to which the COPCs are bioaccessible is uncertain.

The use of AAFs is particularly important when evaluating exposures to chemicals in soils. The bioavailability of chemicals in soils is reduced over time. This is caused by a series of physical and chemical processes that occur when a chemical initially contacts the soil. These processes result in the distribution of the chemical onto the surface of soil particles and sequestration of the chemical into the pores of the soil particles. With sufficient time (which varies by chemical and environmental medium), other processes (e.g., volatilization, biodegradation) remove the chemical from the surface of the soil particle such that the mass of the chemical that can be measured, using standard USEPA analytical techniques, resides primarily within the soil particle itself, and not on the surface. This process is termed "aging," and it results in the migration of the chemical into the interior of the soil particle so that less remains on the exterior surface. This sequestration or aging of the chemical that occurs over time results in reducing the "availability" of the chemical to be absorbed by living organisms. The process of aging reduces the accessibility of a chemical when ingested or dermally contacted by humans because the chemical is bound in the soil matrix and not extracted by stomach acid or skin moisture.

The specific mechanisms for sequestration of chemicals in soil are thought to include: (1) a rapid partitioning of hydrophobic molecules to the external surface of particulate matter in the soil (adsorption or binding to the soil) and (2) slow diffusion of molecules into micropores in the soil particles, remote from the surfaces of soil particles (aging).

Adsorption

Adsorption consists of the partitioning of chemicals from water (or free phase) to the solid organic phase in soil. The tendency for adsorption by a chemical onto soil particles to occur (expressed by the term K_d) is related to the hydrophobicity of the chemical (expressed by the term K_{oc}) and the fraction of organic carbon (f_{oc}) in the soil, as shown in the following equation:

$$K_d = K_{oc} * f_{oc}$$

High K_d and K_{oc} values, such as for PAHs and PCBs, indicate that the chemical is very hydrophobic and will strongly bind to organic matter in the soil.

Aging

In addition to decreased availability due to adsorption (a rapid process), availability of some persistent chemicals in soil decreases steadily over longer periods of time. This process known as aging has been the topic of numerous recent experimental studies and reviews (Alexander, 1995; Linz et al., 1997; Hatzinger and Alexander, 1995; White and Alexander, 1996). A recent review of over 268 technical papers (Linz et al., 1997) concluded the following regarding aging:

- For many persistent organic chemicals, there is a rapid initial phase of disappearance followed by a period in which loss of chemicals slows markedly, although the parent chemical is still present in the soil. Because the initial disappearance phase results from biodegradation, the subsequent decrease in rate of disappearance is thought to result from the sequestering of chemicals in soil such that they are generally unavailable to the micro-organisms that biodegrade them.

- When organic chemicals are added to soil containing naturally aged (and no longer biodegradable) chemicals, the freshly added chemicals are rapidly biodegraded.

- Chemicals that are aged are less readily extracted by solvents.

- Chemicals that are aged are less available to plants and animals.

- Chemicals that are aged are less toxic to plants and animals.

Alexander (1995) proposed that aging results from the slow diffusion of organic chemicals into micropores in soil particles. Organic chemicals bound to hydrophobic surfaces in micropores of soil particles are physically remote from the particle surface where partitioning between the organic and aqueous phase (and desorption of chemicals from soil) occurs. Desorption of organic chemicals from micropores back into the aqueous phase near the surface of the soil particle has been proposed to occur by slow diffusion and to follow a "tortuous path" of repeated sorption and desorption (Linz et al., 1997). Therefore, desorption of aged/sequestered chemicals is likely "enormously retarded" relative to desorption of chemicals bound to the surface of soil particles (Linz et al., 1997).

Experimental evidence supports the conclusion that chemicals in micropores in aged soils are less available to microorganisms, plants or animals, and are relatively less toxic.

- Soil from a site (Newark soil) that was decontaminated and retreated with TCDD (not aged) then administered orally at a dose of 6 ug/kg, killed 19 of 20 guinea pigs, whereas aged Newark soil containing TCDD administered orally at a higher dose of 10 ug/kg, killed only 1 of

18 guinea pigs (Umbreit et al., 1988).

- PAHs were introduced into high organic content soils that had been sterilized to remove organisms that might degrade the PAHs. The soils were then aged for 0, 29 and 45 weeks, and a PAH degrading microorganism was introduced. After a further month, 60% of the PAHs were degraded in the unaged control, 45% in the 29-week soil, and 40% for the 45-week soil. The rates of degradation also decreased with increased aging, suggesting lower concentrations of PAHs available for metabolism, probably due to a decreased rate of transfer of the chemical from an unavailable to an available form. Chemical extraction tests indicated that adsorption of the PAHs to the soil was responsible for the reduction in its bioavailability to microorganisms (Hatzinger and Alexander, 1995).

These and other studies suggest that, for chemicals that have been immobilized in soil by the aging process, the total concentration of the chemical may be a very poor indicator of its toxicity. Primary factors promoting aging of a chemical in soil include (1) hydrophobicity of the chemical, (2) the length of time that the chemical has been present in the soil, and (3) the fraction organic content (f_{oc}) of the soil.

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The description of the AAFs used in this risk assessment are printed in the following order:

1,1,2,2-Tetrachloroethane
1,4-Dichlorobenzene
2,4,5-TP (Silvex)
2,4,6-Trichlorophenol
2,4-Dichlorophenol
2-Chlorophenol
2-Nitroaniline
3-Methylphenol/4-Methylphenol
4,4-DDE
4-Chloroaniline
4-Methyl-2-pentanone
4-Nitroaniline
Acetone
alpha-BHC
Antimony
Arsenic

Benzene
beta-BHC
Cadmium
Carbazole
Chlorobenzene
Chloroform
Cis/Trans-1,2-Dichloroethene
Copper
delta-BHC
Dieldrin
Ethylbenzene
gamma-BHC
Heptachlor
Heptachlor epoxide
Lead
Molybdenum
Nickel
Nitrobenzene
Pentachlorophenol
Phenol
PAHs:
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Dibenzo(a,h)anthracene
- Indeno(1,2,3-cd)pyrene
- Naphthalene

Tetrachloroethene
Toluene
PCBs
Trichloroethene
Vanadium
Vinyl chloride
Zinc
Total 2,3,7,8-TCDD TEQ

AAFs FOR 1,1,2,2-TETRACHLOROETHANE

The oral CSF for 1,1,2,2-tetrachloroethane of 2E-01 $(mg/kg\text{-}day)^{-1}$ provided by IRIS (USEPA, 2000) is based on a gavage study in mice. Due to the lack of chemical-specific information in both mice and humans, it is assumed that absorption is complete (i.e., 100%) and is the same in humans and mice for drinking water, diet, and soil ingestion exposures. Therefore, the AAF (oral-water), AAF (oral-diet), and the AAF (oral-soil) are all (100%)/(100%) = 1 for potential carcinogenic effects. An oral RfD has been provided by NCEA (as reported in the USEPA Region 9 PRG Table dated 10/1999) of 6E-02 mg/kg-day. Due to the lack of chemical-specific information, it is also assumed that the aforementioned AAFs for noncancer effects are also all equal to 1.

A recommended default value (USEPA, 2000) for organics of 1% absorption from dermal exposures to soil and sediment has been used. Thus the AAF (dermal-soil/sediment) is (1%)/(100%) = 0.01 for both potential carcinogenic and noncarcinogenic effects.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading, swimming, or bathing. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). Thus, the AAF (dermal-water) is (100%)/(100%) = 1.0 for both potential carcinogenic and noncarcinogenic effects.

The inhalation CSF for 1,1,2,2-tetrachloroethane is the same as and is based on the oral CSF of 2E-01 $(mg/kg\text{-}day)^{-1}$. Due to the lack of chemical-specific information, it is assumed that the AAF (inhalation) is 1.

Summary of AAFs for 1,1,2,2-Tetrachloroethane

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.01
Dermal-Water	1
Inhalation	1

References

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AAFs FOR 1,2,4-TRICHLOROBENZENE

The oral RfD for 1,2,4-trichlorobenzene of 1E-02 mg/kg-day provided by IRIS (USEPA, 2000) is based on a gavage study in rats. Due to the lack of chemical-specific information in both rats and humans, it is assumed that absorption is complete (i.e., 100%) and is the same in humans and rats for drinking water, diet, and soil ingestion exposures. Therefore, the AAF (oral-water), AAF (oral-diet), and the AAF (oral-soil) are all (100%)/(100%) = 1.

A recommended default value (U.S. EPA, 1992) for organics of 1% absorption from dermal exposures to soil and sediment has been used. Thus the AAF (dermal-soil/sediment) is (1%)/(100%) = 0.01.
The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading, swimming, or bathing. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). Thus, the AAF (dermal-water) is (100%)/(100%) = 1.

The inhalation RfC provided by HEAST (USEPA, 1997) is 2E-01 mg/m^3 and corresponds to an inhalation RfD of 5.71E-02 mg/kg-day. The RfC is based on inhalation studies in rats, rabbits, dogs, and monkeys. Due to the lack of chemical-specific information, it is assumed that absorption is the same in these laboratory animals and humans. Therefore, the AAF (inhalation) is 1.

Summary of AAFs for 1,2,4-Trichlorobenzene

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.01
Dermal-Water	1
Inhalation	1

References

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[URL: http://www.epa.gov/ngispgm3/iris/]

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[URL: http://www.epa.gov/region4/waste/oftecser/healthbul.htm]

AAFs FOR 1,4-DICHLOROBENZENE

The oral CSF for 1,4-dichlorobenzene of 2.4E-02 $(mg/kg\text{-}day)^{-1}$ provided by HEAST (USEPA, 1997) is based on an oral gavage study in mice. Due to the lack of chemical-specific information in both mice and humans, it is assumed that absorption is complete (i.e., 100%) and is the same in humans and mice for drinking water, diet, and soil ingestion exposures. Therefore, the AAF (oral-water), AAF (oral-diet), and the AAF (oral-soil) are all (100%)/(100%) = 1 for potential carcinogenic effects. An oral RfD has been provided by NCEA (as reported in the USEPA Region 9 PRG Table dated 10/1999) of 3E-02 mg/kg-day. Due to the lack of chemical-specific information, it is also assumed that the aforementioned AAFs for noncancer effects are also all equal to 1.

A recommended default value (USEPA, 2000) for organics of 1% absorption from dermal exposures to soil and sediment has been used. Thus the AAF (dermal-soil/sediment) is (1%)/(100%) = 0.01 for both potential carcinogenic and noncarcinogenic effects.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading, swimming, or bathing. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). Thus, the AAF (dermal-water) is (100%)/(100%) = 1.0 for both potential carcinogenic and noncarcinogenic effects.

The inhalation RfC provided on IRIS (USEPA, 2000) for 1,4-dichlorobenzene is 8.0E-01 mg/m^3, and corresponds to an inhalation RfD of 2.3E-01 mg/kg-day. The RfC is based on an inhalation study in rats. Due to the lack of chemical-specific information, it is assumed that absorption of 1,4-dichlorobenzene is the same in rats and in humans. An inhalation CSF is provided by NCEA (as reported in the USEPA Region 9 PRG Table dated 10/1999) of 2.2E-02 $(mg/kg\text{-}day)^{-1}$. Due to the lack of chemical-specific information, it is assumed that the AAF (inhalation) is 1 for both potential carcinogenic and noncarcinogenic effects.

Summary of AAFs for 1,4-Dichlorobenzene

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.01
Dermal-Water	1
Inhalation	1

References

USEPA. 1997. Health Effects Assessment Summary Tables (HEAST). PB97-921199.

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AAFs FOR 2,4,5-TP (Silvex)

The oral RfD for 2,4,5-TP of 8E-03 mg/kg-day provided by IRIS (USEPA, 2000) is based on a dietary study in dogs. The IRIS file reports that 93% of a dose to rats was recovered in the urine; therefore, it is assumed here that absorption of 2,4,5-TP by the oral route of exposure is complete (i.e., 100%) in both dogs and humans. Therefore, the AAF (oral-water), AAF (oral-diet), and the AAF (oral-soil) are all (100%)/(100%) = 1.

A recommended default value (USEPA, 2000) for organics of 1% absorption from dermal exposures to soil and sediment has been used. Thus the AAF (dermal-soil/sediment) is (1%)/(100%) = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading, swimming, or bathing. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). Thus, the AAF (dermal-water) is (100%)/(100%) = 1.0.

Summary of AAFs for 2,4,5-TP (Silvex)

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.01
Dermal-Water	1

References

USEPA. 2000. Integrated Risk Information System (IRIS).
[URL: http://www.epa.gov/ngispgm3/iris/]

USEPA. 2000. Region 4 Human Health Risk Assessment Bulletins - - Supplement to RAGS. USEPA Region 4. Atlanta, GA. Update 05/30/00.
[URL: http://www.epa.gov/region4/waste/oftecser/healthbul.htm]

AAFs FOR 2,4,6-TRICHLOROPHENOL

The oral CSF for 2,4,6-trichlorophenol of 1.1E-02 $(mg/kg\text{-}day)^{-1}$ provided by IRIS (USEPA, 2000) is based on a dietary study in rats. Due to the lack of chemical-specific information in both rats and humans, it is assumed that absorption is complete (i.e., 100%) and is the same in humans and rats for drinking water, diet, and soil ingestion exposures. Therefore, the AAF (oral-water), AAF (oral-diet), and the AAF (oral-soil) are all (100%)/(100%) = 1.

A recommended default value (USEPA, 2000) for organics of 1% absorption from dermal exposures to soil and sediment has been used. Thus the AAF (dermal-soil/sediment) is (1%)/(100%) = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading, swimming, or bathing. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). Thus, the AAF (dermal-water) is (100%)/(100%) = 1.

The inhalation CSF for 2,4,6-trichlorophenol provided by IRIS (USEPA, 2000) is the same as and is based on the oral CSF of 1.1E-02 $(mg/kg\text{-}day)^{-1}$. Due to the lack of chemical-specific information, it is assumed that the AAF (inhalation) is 1.

Summary of AAFs for 2,4,6-Trichlorophenol

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.01
Dermal-Water	1
Inhalation	1

References

USEPA. 2000. Integrated Risk Information System (IRIS).
[URL: http://www.epa.gov/ngispgm3/iris/]

USEPA. 2000. Region 4 Human Health Risk Assessment Bulletins - - Supplement to RAGS. USEPA Region 4. Atlanta, GA. Update 05/30/00.
[URL: http://www.epa.gov/region4/waste/oftecser/healthbul.htm]

AAFs FOR 2,4-DICHLOROPHENOL

The oral RfD for 2,4-dichlorophenol of 3E-03 mg/kg-day provided by IRIS (USEPA, 2000) is based on a drinking water study in rats. Due to the lack of chemical-specific information in both rats and humans, it is assumed that absorption is complete (i.e., 100%) and is the same in humans and rats for drinking water, diet, and soil ingestion exposures. Therefore, the AAF (oral-water), AAF (oral-diet), and the AAF (oral-soil) are all (100%)/(100%) = 1.

A recommended default value (USEPA, 2000) for organics of 1% absorption from dermal exposures to soil and sediment has been used. Thus the AAF (dermal-soil/sediment) is (1%)/(100%) = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading, swimming, or bathing. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). Thus, the AAF (dermal-water) is (100%)/(100%) = 1.

Summary of AAFs for 2,4,6-Dichlorophenol

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.01
Dermal-Water	1

References

USEPA. 2000. Integrated Risk Information System (IRIS).
[URL: http://www.epa.gov/ngispgm3/iris/]

USEPA. 2000. *Region 4 Human Health Risk Assessment Bulletins - - Supplement to RAGS.* USEPA Region 4. Atlanta, GA. Update 05/30/00.
[URL: http://www.epa.gov/region4/waste/oftecser/healthbul.htm]

AAFs FOR 2-CHLOROPHENOL

The oral RfD for 2-chlorophenol of 5E-03 mg/kg-day provided by IRIS (USEPA, 2000) is based on a drinking water study in rats. Due to the lack of chemical-specific information in both rats and humans, it is assumed that absorption is complete (i.e., 100%) and is the same in humans and rats for drinking water, diet, and soil ingestion exposures. Therefore, the AAF (oral-water), AAF (oral-diet), and the AAF (oral-soil) are all (100%)/(100%) = 1.

A recommended default value (USEPA, 2000) for organics of 1% absorption from dermal exposures to soil and sediment has been used. Thus the AAF (dermal-soil/sediment) is (1%)/(100%) = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading, swimming, or bathing. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). Thus, the AAF (dermal-water) is (100%)/(100%) = 1.

Summary of AAFs for 2-Chlorophenol

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.01
Dermal-Water	1

References

USEPA. 2000. Integrated Risk Information System (IRIS).
URL: http://www.epa.gov/ngispgm3/iris/]

USEPA. 2000. Region 4 Human Health Risk Assessment Bulletins - - Supplement to RAGS. USEPA Region 4. Atlanta, GA. Update 05/30/00.
[URL: http://www.epa.gov/region4/waste/oftecser/healthbul.htm]

AAFs FOR 2-NITROANILINE AND 4-NITROANILINE

HEAST (USEPA, 1997) provides an inhalation RfC for 2-nitroaniline of 2E-04 mg/m^3 which corresponds to an inhalation RfD of 5.71E-05 mg/kg-day. The RfC is based on an inhalation study in rats. Due to the lack of chemical-specific information, it is assumed that absorption is the same in rats and humans, thus the AAF (inhalation) is 1.

Due to the lack of chemical-specific dose-response values for 4-nitroaniline, the dose-response value and AAFs for 2-nitroaniline will be used to evaluate this constituent.

Summary of AAFs for 2-Nitroaniline/4-Nitroaniline

Inhalation	1

References

USEPA. 1997. Health Effects Assessment Summary Tables (HEAST). PB97-921199.

AAFs FOR 3-METHYLPHENOL/4-METHYLPHENOL

The oral RfD for 3-methylphenol of 5E-02 mg/kg-day provided by IRIS (USEPA, 2000) is used to evaluate total 3- and 4-methylphenol. The RfD is based on a gavage study in rats. Due to the lack of chemical-specific information in both rats and humans, it is assumed that absorption is complete (i.e., 100%) and is the same in humans and rats for drinking water, diet, and soil ingestion exposures. Therefore, the AAF (oral-water), AAF (oral-diet), and the AAF (oral-soil) are all (100%)/(100%) = 1.

A recommended default value (USEPA, 2000) for organics of 1% absorption from dermal exposures to soil and sediment has been used. Thus the AAF (dermal-soil/sediment) is (1%)/(100%) = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading, swimming, or bathing. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). Thus, the AAF (dermal-water) is (100%)/(100%) = 1.

Summary of AAFs for 3-Methylphenol/4- Methylphenol

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.01
Dermal-Water	1

References

USEPA. 2000. Integrated Risk Information System (IRIS).
[URL: http://www.epa.gov/ngispgm3/iris/]

USEPA. 2000. Region 4 Human Health Risk Assessment Bulletins - - Supplement to RAGS. USEPA Region 4. Atlanta, GA. Update 05/30/00.
[URL: http://www.epa.gov/region4/waste/oftecser/healthbul.htm]

AAFs FOR 4,4'-DDE

The oral CSF for 4,4'-DDE of 3.4E-01 $(mg/kg\text{-}day)^{-1}$ provided by IRIS (USEPA, 2000) is based on a dietary study in mice and hamsters. Due to the lack of chemical-specific information in mice and hamsters and humans, it is assumed that absorption is complete (i.e., 100%) and is the same in humans and mice and hamsters for drinking water, diet, and soil ingestion exposures. Therefore, the AAF (oral-water), AAF (oral-diet), and the AAF (oral-soil) are all (100%)/(100%) = 1.

A recommended default value (USEPA, 2000) for organics of 1% absorption from dermal exposures to soil and sediment has been used. Thus the AAF (dermal-soil/sediment) is (1%)/(100%) = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading, swimming, or bathing. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). Thus, the AAF (dermal-water) is (100%)/(100%) = 1.

Summary of AAFs for 4,4'-DDE

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.01
Dermal-Water	1

References

USEPA. 2000. Integrated Risk Information System (IRIS).
[URL: http://www.epa.gov/ngispgm3/iris/]

USEPA. 2000. Region 4 Human Health Risk Assessment Bulletins - - Supplement to RAGS. USEPA Region 4. Atlanta, GA. Update 05/30/00.
[URL: http://www.epa.gov/region4/waste/oftecser/healthbul.htm]

AAFs FOR 4-CHLOROANILINE

The oral RfD for 4-chloroaniline of 4E-03 mg/kg-day provided by IRIS (USEPA, 2000) is based on a dietary study in rats. Due to the lack of chemical-specific information in rats and humans, it is assumed that absorption is complete (i.e., 100%) and is the same in humans and rats for drinking water, diet, and soil ingestion exposures. Therefore, the AAF (oral-water), AAF (oral-diet), and the AAF (oral-soil) are all (100%)/(100%) = 1.

A recommended default value (USEPA, 2000) for organics of 1% absorption from dermal exposures to soil and sediment has been used. Thus the AAF (dermal-soil/sediment) is (1%)/(100%) = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading, swimming, or bathing. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). Thus, the AAF (dermal-water) is (100%)/(100%) = 1.

Summary of AAFs for 4-Chloroaniline

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.01
Dermal-Water	1

References

USEPA. 2000. Integrated Risk Information System (IRIS).
[URL: http://www.epa.gov/ngispgm3/iris/]

USEPA. 2000. Region 4 Human Health Risk Assessment Bulletins - - Supplement to RAGS. USEPA Region 4. Atlanta, GA. Update 05/30/00.
[URL: http://www.epa.gov/region4/waste/oftecser/healthbul.htm]

AAFs FOR 4-METHYL-2-PENTANONE

The oral RfD for 4-methyl-2-pentanone (also known as methyl isobutyl ketone) is 8E-02 mg/kg-day (HEAST, 1997), and is based on an oral gavage study in rats. Due to the lack of chemical-specific information, it is assumed that absorption is the same in humans for drinking water, dietary, and soil ingestion exposures as in the dose-response study. Therefore, the AAF (oral-water), the AAF (oral-diet), and the AAF (oral-soil) are all 1.

A recommended default value (USEPA, 2000) for organics of 1% absorption from dermal exposures to soil and sediment has been used. Thus, the AAF (dermal-soil) is (1%/100%) = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading, swimming, or bathing. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). Thus, the AAF (dermal-water) is (100%)/(100%) = 1.

The inhalation RfC of 8E-02 mg/m^3 provided in HEAST (USEPA, 1997) corresponds to an inhalation RfD of 2.29E-02 mg/kg-day. The RfC is based on an inhalation study in rats. Due to the lack of chemical-specific information, it is assumed that the AAF (inhalation) is 1.

Summary of AAFs for 4-Methyl-2-Pentanone

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.01
Dermal-Water	1
Inhalation	1

References

USEPA. 1997. Health Effects Assessment Summary Tables (HEAST). PB97-921199.

USEPA. 2000. Region 4 Human Health Risk Assessment Bulletins - - Supplement to RAGS. USEPA Region 4. Atlanta, GA. Update 05/30/00. URL:http://www.epa.gov/region4/waste/oftecser/healthbul.htm]

AAFs FOR ACETONE

The oral RfD for acetone (1E-01 mg/kg-day) provided in IRIS (USEPA, 2000) is based on a gavage study in rats. Absorption in the dose-response study is assumed to be 100%. Based on absorption information on other volatile organic compounds, it is assumed that absorption is the same in animals and humans for gavage, drinking water, diet, and soil/sediment ingestion exposures. Thus, the AAF (oral-water), the AAF (oral-diet), and the AAF (oral-soil) are all 1. A recommended default value (USEPA, 2000) for organics of 1% for dermal absorption from soil has been used. Thus, the AAF (dermal-soil) is (1%)/(100%) = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading, swimming, or bathing. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study); thus the AAF (dermal-water) is (100%)/(100%) = 1.

Summary of AAFs for Acetone

Oral-water	1
Oral-diet	1
Oral-soil	1
Dermal-soil	0.01
Dermal-water	1

References

USEPA. 2000. Integrated Risk Information System (IRIS).
[URL: http://www.epa.gov/ngispgm3/iris/]

USEPA. 2000. Region 4 Human Health Risk Assessment Bulletins - - Supplement to RAGS. USEPA Region 4. Atlanta, GA. Update 05/30/00.
[URL: http://www.epa.gov/region4/waste/oftecser/healthbul.htm]

AAFs FOR ALDRIN

The oral CSF for aldrin of 1.7E+01 $(mg/kg\text{-}day)^{-1}$ provided in IRIS (USEPA, 2000) is based on a dietary study in mice. The oral RfD for aldrin of 3E-05 mg/kg-day is based on a dietary study in rats. Due to the lack of chemical-specific information in both mice and rats and humans, it is assumed that absorption is complete (i.e., 100%) and is the same in humans and mice and rats for drinking water, diet, and soil ingestion exposures. Therefore, the AAF (oral-water), AAF (oral-diet), and the AAF (oral-soil) are all (100%)/(100%) = 1.

A recommended default value (U.S. EPA, 1992) for organics of 1% absorption from dermal exposures to soil and sediment has been used. Thus the AAF (dermal-soil/sediment) is (1%)/(100%) = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading, swimming, or bathing. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). Thus, the AAF (dermal-water) is (100%)/(100%) = 1.0.

Summary of AAFs for Aldrin

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.01
Dermal-Water	1
Inhalation	1

References

USEPA. 2000. Integrated Risk Information System (IRIS).
[URL: http://www.epa.gov/ngispgm3/iris/]

USEPA. 2000. Region 4 Human Health Risk Assessment Bulletins - - Supplement to RAGS. USEPA Region 4. Atlanta, GA. Update 05/30/00.
[URL: http://www.epa.gov/region4/waste/oftecser/healthbul.htm]

AAFs FOR alpha-BHC

The oral CSF for alpha-BHC of 6.3E+0 $(mg/kg\text{-}day)^{-1}$ provided in IRIS (USEPA, 2000) is based on a dietary study in mice. Due to the lack of chemical-specific information in both mice and humans, it is assumed that absorption is complete (i.e., 100%) and is the same in humans and mice for drinking water, diet, and soil ingestion exposures. Therefore, the AAF (oral-water), AAF (oral-diet), and the AAF (oral-soil) are all (100%)/(100%) = 1.

A recommended default value (USEPA, 2000) for organics of 1% absorption from dermal exposures to soil and sediment has been used. Thus the AAF (dermal-soil/sediment) is (1%)/(100%) = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading, swimming, or bathing. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). Thus, the AAF (dermal-water) is (100%)/(100%) = 1.

The inhalation unit risk factor of 1.8E-03 $(ug/m^3)^{-1}$ provided in IRIS corresponds to an inhalation CSF of 6.3E+0 $(mg/kg/day)^{-1}$ and is based on the mouse dietary study used to develop the oral CSF. Due to the lack of chemical-specific information, it is assumed that the AAF (inhalation) is 1.

Summary of AAFs for alpha-BHC

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.01
Dermal-Water	1
Inhalation	1

References

USEPA. 2000. Integrated Risk Information System (IRIS). [URL: http://www.epa.gov/ngispgm3/iris/]

USEPA. 2000. Region 4 Human Health Risk Assessment Bulletins - - Supplement to RAGS. USEPA Region 4. Atlanta, GA. Update 05/30/00. [URL: http://www.epa.gov/region4/waste/oftecser/healthbul.htm]

AAFs FOR ANTIMONY

The USEPA oral RfD of 4E-04 mg/kg-day provided on IRIS (USEPA, 2000) is based on a drinking water study in rats using potassium antimony tartrate. Antimony is poorly absorbed across the gastrointestinal tract with one report of 15 percent absorption of ingested potassium antimony tartrate by rats (USEPA, 1990). It is assumed that the absorption of antimony in the diet and soil is the same as that in drinking water. Thus, the AAF (oral-diet), the AAF (oral-soil), and the AAF (oral-water) are all 1.

Dermal absorption of antimony is also reported to be poor, although specific estimates were not located (USEPA, 1990). A recommended default value for inorganics of 0.1 percent for the dermal absorption from soil *(USEPA, 2000) has been used. Assuming that the gastrointestinal absorption of* antimony from the drinking water study was 15 percent results in an AAF (dermal-soil) of 0.1%/15% = 0.007.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading or swimming. The methodology for quantifying risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, rather than adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). For antimony, the AAF (dermal-water) is (100%)/(15%) = 6.7.

Summary of AAFs for Antimony

Oral-Water	1.0
Oral-Diet	1.0
Oral-Soil	1.0
Dermal-Soil	0.007
Dermal-Water	6.7

References

U.S. EPA. 1990. Drinking Water Criteria Document for Antimony. U.S. Environmental Protection Agency. Office of Drinking Water. April 1990.

USEPA. 2000. Integrated Risk Information System (IRIS).
[URL: http://www.epa.gov/ngispgm3/iris/]

USEPA. 2000. Region 4 Human Health Risk Assessment Bulletins - - Supplement to RAGS. USEPA Region 4. Atlanta, GA. Update 05/30/00.
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AAFs FOR ARSENIC

These AAFs are appropriate for use with the following dose-response values for arsenic:

- The oral reference dose (RfD) for arsenic, which is 3E-04 mg/kg-day (USEPA, 2000)
- The oral cancer slope factor (CSF) for arsenic, which is 1.5E+00 $(mg/kg\text{-}day)^{-1}$ (USEPA, 2000).
- The inhalation CSF for arsenic, which is 1.5E+01 $(mg/kg\text{-}day)^{-1}$ (USEPA, 2000).

Absorption in the Dose-Response Study

Both oral toxicity values for arsenic are based on epidemiological studies that characterized health effects in a large population of Taiwanese who consumed drinking water containing arsenic. The exact form of the ingested arsenic is unknown. For the purposes of the development of the AAFs, it has been assumed that the arsenic was a soluble inorganic arsenic salt (such as arsenic trioxide, As2O3, a smelting by-product). Several studies investigating the absorption of arsenic have been performed in humans and various animal species. Human studies are sufficiently extensive to strongly suggest that close to 100% of soluble inorganic arsenic in water is absorbed from the gastrointestinal tract. These human studies are reviewed in detail here.

One direct indication of absorption of an orally administered dose of a chemical is its urinary excretion. Several studies show that urinary excretion can account for the majority of an orally administered dose of arsenic. Buchet et al. (1981a) administered aqueous sodium arsenite (NaAsO2) as a single dose to three human volunteers. An average of 45% of the dose was excreted in the urine in four days. In a second study (Buchet et al., 1981b), four individuals given 125, 250, 500, or 1000 μg As/day orally for five days excreted 54, 73, 74, and 64% of the dose in urine, respectively, over 14 days. The average urinary excretion of arsenic for the four subjects was 66% of the administered dose. Crecelius (1977) reports that approximately 50% and 80% of orally administered aqueous arsenic was excreted in urine within 61 hours by a single individual in two experiments. The results of these studies represent the minimum amount of arsenic absorbed since the balance of the dose was not accounted for.

Data for human fecal excretion of arsenic do exist. Pomroy et al. (1980) gave 6 male subjects radiolabelled arsenic acid ($[^{74}As]H_3AsO_4$) in gelatin capsules followed by a glass of water. The presence of arsenic in the body, urine, and feces was measured using a whole body radiation counter. The authors report that for the six subjects the average total excretion over 7 days was $6.1 \pm 2.8\%$ in feces. It is not possible to determine how much of this arsenic was first absorbed and then excreted. The total recovery of arsenic (urine plus feces) was $68.4 \pm 4.0\%$ of the single oral dose. The remaining arsenic was reported to be present in the body tissues; virtually the entire dose could be accounted for. This suggests a minimum absorption of 94% (100% - 6%) of orally ingested arsenic.

A study by Bettley and O'Shea (1975) also reports excretion of arsenic in both urine and feces. Three subjects were exposed to 8.52 mg As (as 1.25 ml of Liq. Arsenicalis B.P.) in three portions 8 hours apart on one day. They found that at most 3.5% of the dose was excreted in feces over ten days. This suggests a minimum absorption of 96%. Urinary excretion averaged 52$\pm$4% of the exposure dose over 10 days (n=3). The remaining half of the dose was unaccounted for, although small amounts of arsenic were found in blood and hair.

In the Coulson study (Coulson et al., 1935), results from two humans each ingesting two forms of arsenic are reported. Less than 5% of an oral dose was excreted in feces whether the arsenic was taken as arsenic trioxide (As_2O_3) or as natural arsenic present in shrimp. The remainder of the dose, more than 95%, was recovered in urine in three experiments where total recoveries ranged from 74 to 115%. Based on the fecal excretion data from this study, it can be estimated that at least 95% of the ingested arsenic was absorbed. The fecal excretion data are consistent with those of Pomroy et al. (1980) and Bettley and O'Shea (1975).

Fecal excretion data from oral studies provide a minimum estimate of absorption, because it cannot be determined how much of the dose was first absorbed and then excreted into the feces. However, a study in humans injected intravenously with arsenic suggests that absorbed arsenic may be excreted, presumably from bile, into the feces. Mealy et al. (1959) administered radiolabelled arsenic by intravenous injection. Between 57% and 90% of the injected dose was recovered in urine in 10 days. Fecal excretion accounted for 1.3% of the dose after seventeen days in one individual. A second subject excreted 0.2% of the intravenous dose into the feces in one week. Both results indicate some excretion of arsenic into the feces. Virtually all of the remaining dose was recovered in the urine. Biliary excretion of arsenic has been demonstrated in rats, rabbits, and dogs (Klaassen, 1974; Gregus and Klaassen, 1986). This indicates that a portion of the arsenic found in feces in studies using oral dosing may have been first absorbed and then excreted.

The urinary excretion data from the oral studies discussed above provide minimum estimates of arsenic absorption ranging from 45% to 95%. The fecal excretion data suggest that, at a minimum, 95-96% of an orally administered dose of arsenic is absorbed. The study of intravenously administered arsenic suggest that biliary excretion can occur. Therefore, it can conservatively be concluded from the above studies that virtually 100% of an orally administered dose of soluble inorganic arsenic can be absorbed in humans.

Oral-Water AAF

The oral-water AAF for arsenic is defined as: (absorption of arsenic in humans from ingested water) / (absorption of arsenic in humans in the epidemiological study from ingested water). Since the route, matrix, and species are the same for the potential exposure in a risk assessment and the exposure in the dose-response study, the AAF is by definition 1.0. Moreover, the above results suggest that virtually all soluble inorganic arsenic administered orally in water can be absorbed from the gastrointestinal tract. Thus, it is assumed here that 100% of the arsenic was absorbed in the dose-response studies, in which humans ingested arsenic as a component in drinking water, and in the exposure route of concern - human ingestion of drinking water. Therefore, the AAF can also be defined as (100%)/(100%) = 1.

Oral-Diet AAF

The AAF (oral-diet) for this chemical is defined as: (absorption in humans from ingested diet)/(absorption in humans from arsenic in water). Gastrointestinal absorption of arsenic from diet is assumed to be 100% in the absence of other information. Therefore, the AAF (oral-diet) is (100%)/(100%) = 1.

Oral-Soil AAF

The oral-soil AAF for arsenic is defined as: (absorption of arsenic in humans from ingested soil) / (absorption of arsenic in humans in the epidemiological study from ingested water).

An oral-soil AAF of 0.3 is recommended for arsenic in soil and dust in cases where site-specific information is not available. The 0.3 value is based on the high end of relative bioavailability estimates for arsenic ingested in soil and dust by *Cynomolgus* monkeys (Freeman et al., 1995).

The study was conducted to determine arsenic absorption from soil and house dust impacted by smelter activities near Anaconda, Montana. The Cynomolgus monkeys each received sequential treatments of iv sodium arsenate and three oral treatments: soil arsenic in capsules, house dust arsenic in capsules, and sodium arsenate solution administered by gavage. Absolute bioavailability values for arsenic administered in soil, dust, and solution were calculated based on (1) total urinary arsenic excretion and (2) blood arsenic levels, each normalized based on intravenous data. The bioavailability of arsenic in soil and dust relative to soluble arsenic in solution ranged from 10% to 30%, depending or whether urinary or blood values were used. Results from this study were used by USEPA to derive the oral-soil AAF of 0.183 and oral-dust AAF of 0.258 used in the risk assessment at the Anaconda Superfund site (Walker and Griffin, 1998).

<u>Other Relevant Studies</u>

Other studies of various forms of arsenic support the conclusion that arsenic in soil is poorly absorbed. At the Murray Smelter Superfund site in Utah, a site-specific relative bioavailability adjustment value for arsenic in soil of 0.26 was derived based on an immature swine study comparing absorption of arsenic in soil from the site to absorption of soluble sodium arsenate (Weis et al., 1996; USEPA,1997). In a similar swine study performed at the Ruston/North Tacoma Superfund site in Washington, the site-specific relative bioavailability adjustment value for arsenic in slag dust was 0.42 (USEPA, 1996). Groen et al. (1994) fed ore-containing soil or administered soluble arsenic iv, sequentially to beagle dogs. When compared to iv administration, bioavailability of arsenic from ore-containing soil was approximately 8%. In rabbits, the absorption of arsenic (primarily as Cu_3AsS_4) in soil from a site in

Anaconda, Montana was only 24%, while the absorption of a soluble form arsenic from water was 50% (Freeman et al., 1993). Rats fed soil containing mine waste absorbed only one tenth times as much arsenic as rats dosed with soluble arsenic (Yanez et al., 1993). Arsenic selenide, a highly insoluble form, was administered to humans as a fine powder and no increase in urinary arsenic was observed (Mappes, 1977). Thus, absorption in this study was probably low or negligible.

Derivation of the AAF (Oral-Soil) for Arsenic

An oral-soil AAF of 0.3 is recommended for arsenic in soil and dust in cases where site-specific information is not available. The 0.3 value is based on the high end of relative bioavailability estimates for arsenic ingested in soil and dust by *Cynomolgus* monkeys (Freeman et al., 1995). This study was selected to derive the oral-soil AAF for arsenic because, of the animals models studied thus far, the monkey is more physiologically and anatomically similar to humans than are rats, rabbits, swine, or dogs.

Dermal-Soil AAF

A recommended default value for inorganics of 0.1 percent for the dermal absorption of arsenic from soil (USEPA Region 4, 2000) has been used. Assuming that the gastrointestinal absorption of arsenic from drinking water is 100%, results in an AAF (dermal-soil) of 0.1%/100% = 0.001.

Dermal-Water AAF

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading, swimming, or bathing. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). Thus, the AAF (dermal-water) is (100%)/(100%) = 1 for both potential carcinogenic and noncarcinogenic effects.

Inhalation AAF

The inhalation unit risk for assessing carcinogenic effects of arsenic is 4.3E-03 $(\mu g/m^3)^{-1}$. This corresponds to an inhalation CSF of 15 $(mg/kg\text{-}day)^{-1}$, assuming a 70 kg adult breathes 20 m^3 air per day. The unit risk is based on human epidemiological studies, and it is assumed for the purposes of this report that inhalation absorption of arsenic in humans in the exposure scenarios is the same as that of humans in the dose-response study. It is assumed by USEPA that absorption of arsenic adsorbed to respirable particles that are retained in the lung is 30%. Therefore, the AAF (inhalation) is (30%)/(30%) = 1.0 for carcinogenic effects.

Summary of Derived AAFs for Arsenic

Oral-Water	1
Oral-Diet	1
Oral-Soil	0.3
Dermal-Soil	0.001
Dermal-Water	1
Inhalation	1 (for carcinogenic effects)

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AAFs FOR BENZENE

The oral cancer slope factor range for benzene (0.015 to 0.055 (mg/kg-day)$^{-1}$) is based on inhalation data from an occupational epidemiological study. Therefore, it is assumed that 47% of an ingested dose will be absorbed, as determined below for an inhaled dose. Based on absorption information on other volatile organic compounds, it is assumed that absorption is the same in humans for inhalation and drinking water, diet, and soil or sediment ingestion exposures. The oral RfD for benzene of 3E-03 mg/kg-day provided by the NCEA is based on a drinking water study in mice. It is assumed that absorption in the dose-response study and absorption in humans is equivalent. Thus the AAF (oral-water), the AAF (oral-diet), and the AAF (oral-soil) are all 1 for potential carcinogenic and noncarcinogenic effects.

ENSR has used a recommended default value for organics of 1% for dermal absorption of benzene from soil and sediment (USEPA, 2000). Thus, the AAF (dermal-soil) is (1%)/(47%) = 0.02 for both potential carcinogenic and noncarcinogenic effects.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading or swimming. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). For benzene, the AAF (dermal-water) is (100%)/(47%) = 2.13 for both potential carcinogenic and noncarcinogenic effects.

The inhalation CSF range for benzene of 0.0077 to 0.0273 (mg/kg-day)$^{-1}$ is based on epidemiological studies of humans exposed by inhalation (USEPA, 2000). Several studies in humans indicate that about 47% of an inhalation dose is absorbed, with a range between 28% to 60% (Owen, 1990). Since both the study used to derive the CSF and the exposure pathway of concern are inhalation of benzene by humans, the AAF (inhalation) for carcinogenic effects is 1.

The inhalation RfC of 6E-03 mg/m^3, which is equivalent to an inhalation RfD of 1.7E-3 mg/kg-day, provided by the NCEA is based on an inhalation study in mice. It is assumed that absorption of benzene in mice and humans is equivalent, thus the AAF (inhalation) for noncarcinogenic effects is 1.

Summary of AAFs for Benzene

Oral-water	1
Oral-diet	1
Oral-soil	1
Dermal-soil	0.02
Dermal-water	2.13
Inhalation	1

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AAFs FOR beta-BHC

The oral CSF for beta-BHC of 1.8E+0 $(mg/kg\text{-}day)^{-1}$ provided by IRIS (USEPA, 2000) is based on a dietary study in mice. Due to the lack of chemical-specific information in both mice and humans, it is assumed that absorption is complete (i.e., 100%) and is the same in humans and mice for drinking water, diet, and soil ingestion exposures. Therefore, the AAF (oral-water), AAF (oral-diet), and the AAF (oral-soil) are all (100%)/(100%) = 1.

A recommended default value (USEPA, 2000) for organics of 1% absorption from dermal exposures to soil and sediment has been used. Thus the AAF (dermal-soil/sediment) is (1%)/(100%) = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading, swimming, or bathing. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). Thus, the AAF (dermal-water) is (100%)/(100%) = 1.

The inhalation CSF for beta-BHC of 1.8E+0 $(mg/kg\text{-}day)^{-1}$ provided by IRIS (USEPA, 2000) is based on the mouse dietary study used for the development of the oral CSF. Due to the lack of chemical-specific information, it is assumed that absorption is the same in mice and humans; therefore, the AAF (inhalation) is 1.

Summary of AAFs for beta-BHC

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.01
Dermal-Water	1
Inhalation	1

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AAFs FOR CADMIUM

These AAFs are appropriate for use with the following dose-response values for cadmium:

- The oral Reference Dose (RfD) for exposures to cadmium in food, which is 1.0E-3 mg/kg-day (USEPA, 2000)

- The oral Reference Dose (RfD) for exposures to cadmium in water, which is of 5E-04 mg/kg-day (USEPA, 2000)

- The inhalation cancer slope factor (CSF) for cadmium, which is 6.3 $(mg/kg\text{-}day)^{-1}$ (USEPA, 2000)

Absorption in the Dose-Response Study

The noncarcinogenic dose-response values for cadmium are based on a one-compartment toxicokinetic model that evaluated a large quantity of both human and animal toxicity data (Friberg et al., 1974; USEPA, 1985). The RfDs are based on the highest level of cadmium in the human renal cortex (i.e. the critical level) not associated with significant proteinuria (i.e. the critical effect). This critical level has been estimated to be 200 µg/gm wet weight human renal cortex. The toxicokinetic model assumes that 0.01% of the cadmium body burden is eliminated per day (USEPA, 1985). In deriving the RfDs for cadmium, USEPA assumed that absorption was different for cadmium ingested in food and water (the model itself does not provide estimates for absorption of cadmium ingested in water). Using a 5% absorption factor for drinking water exposure and a 2.5% absorption factor for dietary exposure, USEPA estimated that a daily intake of 0.005 and 0.01 mg/kg-day, respectively would be required to produce a concentration of 200 ug/gm wet weight in the renal cortex during a lifetime of exposure (USEPA, 2000). These values were divided by 10 to obtain the RfDs of 1E-03 (diet) and 5E-04 mg/kg-day (water). Because these absorption values were used by USEPA to derive the dose-response values for cadmium, they will also be used to determine the AAF values for cadmium.

It should be noted that USEPA (1993) performed a case study on cadmium to determine if there was adequate evidence to support the different media-specific (i.e., food and water) RfDs. In the study, information was used from 35 published studies where rats ingested cadmium in either rat chow or drinking water ad libitum for chronic durations and cadmium levels in the liver and/or kidney were subsequently measured. Based on the analysis, the bioavailability of cadmium ingested in food was not measurably different from that ingested in water in non-fasted rats (fed ad libitum). Instead, in this non-fasting scenario, total diet rather than the actual medium of exposure, appeared to be more of a determining factor for the uptake of cadmium from the GI tract. Based on these results, USEPA (1993) recommended that distinct RfDs for cadmium ingested in food and drinking water not be based on the assumption that the bioavailability of cadmium in drinking water is greater than that of cadmium in food (also published as Ruoff et al., 1994).

AAF (Oral-Water)

The AAF (oral-water) is defined for cadmium as: (absorption in humans from ingested water) / (absorption from water in the toxicokinetic model). Absorption of approximately 5% was assumed in the toxicokinetic model for cadmium administered orally in water. Therefore, since the toxicokinetic model is for the same route and matrix relevant to the human exposure of concern, the AAF is simply 1, or (5%)/(5%). This AAF is intended to be used with the RfD for water. As discussed above, USEPA (1993) concluded that, (1) in non-fasting scenarios, the absorption of cadmium ingested in water is likely the same as the absorption of cadmium ingested in the diet and (2) that distinct RfDs for cadmium ingested in food and drinking water should not be based on the assumption that the *bioavailability of cadmium in drinking water is greater than that of cadmium in food* (also published as Ruoff et al., 1994).

Therefore, using the RfD for cadmium ingested in water, with oral-water AAF of 1, may overestimate the toxicity of cadmium ingested in water.

AAF (Oral-Diet)

The AAF (oral-diet) is defined as: (absorption in humans from ingested diet)/(absorption from diet in the toxicokinetic model). Absorption of approximately 2.5% was assumed in the toxicokinetic model for absorption of cadmium from diet. Thus, since the toxicokinetic model is for the route and matrix relevant to human exposure, the AAF is simply 1. This AAF is intended to be used with the RfD for diet.

AAF (Oral-Soil)

The AAF (oral-soil) is defined for cadmium as: (absorption in humans from ingested soil) / (absorption from diet in the toxicokinetic model). The AAF (oral-soil) of 1 is derived below. This AAF is intended to be used with the RfD for diet.

Griffin et al. (1991) have studied the absorption of radiolabelled $^{109}CdCl_2$ present in an aqueous slurry with sand or clay soils. Crl:CD BR rats (4/sex/dose) were administered cadmium by IV (0.5 mg/kg), oral gavage of an aqueous solution (8 or 40 mg/kg), or oral gavage of an aqueous sandy-loam or clay-loam slurry (8 or 40 mg/kg). The cadmium containing soils were prepared by mixing a soil sample with an aqueous solution of $^{109}CdCl_2$, allowing the soil to dry, and then resuspending the soil in an aqueous slurry. Blood was collected at intervals up to 48 hours post-dosing and analyzed for ^{109}Cd by liquid scintillation counting. Absorption of cadmium was measured based on the area under the blood concentration vs. time curve (AUC), using either the IV group or the aqueous oral gavage group AUC as the comparative standard. The results of the Griffin et al. (1991) study are presented in Table 1.

Two points must be considered before evaluating the data in this experiment. First, the concentration of cadmium in soil that would support an 8 mg/kg-day dose in a 15 kg child assumed to ingest 200 mg of soil per day would be 600,000 ppm. The concentration of cadmium in soil that would support this dose in a child assumed to exhibit pica behavior, i.e., ingest 10 g soil/day, would be 12,000 ppm. Likewise, a 40 mg/kg dose is equivalent to exposure by a pica child to soils that are 60,000 ppm cadmium. These high dose levels may have been required in the experiment based on detection limit constraints. However, soil concentrations of cadmium at Superfund sites are unlikely to be as high any either of these values. Therefore, only the results of the lower test groups will be considered in the development of the AAF.

Second, the method of preparation of cadmium-containing soils is unlikely to mimic the physical state of cadmium in weathered soils, where it would be expected to be present in complex mineralogical forms. However, since this is the only study available that evaluates cadmium absorption from soils, it must be considered.

From the data presented in Table 1, it is evident that absorption from both the sand- and clay-based soils was less than absorption of the same dose of cadmium when administered by oral gavage. The average relative absorption of cadmium from the soils (compared to the oral aqueous gavage data) is 41.5%. Thus, oral absorption of cadmium from soils is roughly half of that from an aqueous solution.

Table 1. Data from Griffin et al. (1991) for Cadmium

TEST GROUP	ROUTE OF EXPOSURE	DOSE (mg/kg)	ABSOLUTE ABSORPTION*	RELATIVE ABSORPTION**
1	IV	0.5	100	-
2	Oral/Water	8	0.95	100
3	Oral/Water	40	1.85	100
4	Oral/Sand	8	0.6	61.9
5	Oral/Sand	40	1.6	84.5
6	Oral/Clay	8	0.2	21.1
7	Oral/Clay	40	0.2	13.0

* Absolute absorption is relative to IV dose group data.
** Relative absorption is relative to aqueous oral gavage dose group data at the same dose.

A more recent study also indicates that oral absorption of cadmium from soils is roughly half of that from an aqueous solution in rats (Schilderman et al., 1997). Based on blood cadmium levels, bioavailability in rats ingesting cadmium chloride in soil was 43% of that in rats ingesting cadmium chloride in saline solution. The authors concluded that the soil matrix significantly reduced the absorption of cadmium from the gastrointestinal tract.

One must now attempt to use these data for human exposure assessment. The estimate of human oral absorption of cadmium comes from a toxicokinetic model that was based on many human and animal studies. In that model, the absorption of cadmium from food (2.5%) is estimated to be half of that from drinking water (5%) in humans. Although the absolute absorption values are not directly comparable between rats and humans, a comparison of absorption from soil and water can be made between the two species. Cadmium absorption from soil in rats is approximately half of that from water, as shown above. Assuming that the comparison of cadmium absorption from soil and water in rats can be extrapolated to humans, then it can be concluded that absorption in humans of cadmium from soil should be half that from water. In this case, human absorption of cadmium from water is 5%. Therefore, oral absorption of cadmium from soil would be 2.5%, which is equivalent to human absorption of cadmium from food. The AAF (oral-soil) is defined for cadmium as: (absorption in humans from ingested soil) / (absorption from diet in the toxicokinetic model). Therefore, the AAF for oral exposure to cadmium containing soils, to be used with the RfD for cadmium ingested in food, is:

AAF = (2.5%) / (2.5%) = 1.

A typical default assumption in the absence of data would be simply to assume that absorption from soil was the same as from diet. Therefore, using either approach gives similar results; thus the AAF (oral-soil) is 1.

The Griffin et al. (1991) study does suggest that site-specific information derived from the actual soils present could result in an AAF that is either lower or higher than that derived here. Such information could be obtained either from appropriate absorption studies in animals or from in vitro extraction experiments under conditions mimicking the stomach, i.e., pH 2.

AAF (Dermal-Soil)

The AAF (dermal-soil) is defined for this chemical as: (absorption in humans from dermal contact with soil) / (absorption from food in the toxicokinetic model). The AAF (dermal-soil) of 0.04 is derived below. This value is to be used with the RfD for diet.

A recommended default value for inorganics of 0.1 percent for the dermal absorption of cadmium from soil (USEPA, 2000) has been used. Assuming that the gastrointestinal absorption of cadmium from food is 2.5%, results in an AAF (dermal-soil) of 0.1%/2.5% = 0.04.

AAF (Dermal-Water)

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading or swimming or potable water when bathing. The methodology for quantitating risks posed by these exposure pathways uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. The dose-response value for cadmium, however, is based on administered dose. Thus, the AAF (dermal-water) is defined as: (100%) / (absorption from diet in the toxicokinetic model).

To derive the AAF (dermal-water), the absorption from food of 2.5% assumed in the toxicokinetic model is used. Accordingly, the AAF (dermal-water) is 100% / 2.5% = 40. This value is for use with the RfD for diet.

AAF (Inhalation)

The AAF (inhalation) is defined for potential carcinogenic effects as: (absorption in humans from inhaled materials)/(absorption in workers from inhaled materials). The inhalation AAF (carcinogenic) of 1.0 is derived below.

The inhalation unit risk for cadmium (1.8×10^{-3} $(\mu g/m^3)^{-1}$) is derived from a human occupational inhalation study. This corresponds to an inhalation CSF of 6.3 $(mg/kg/day)^{-1}$. It is assumed that absorption in humans from respirable soil particles retained in the lung is the same as absorption of cadmium by workers in the dose-response study. Thus, the AAF (inhalation) for carcinogenic effects is 1.

Summary of AAFs Derived for Cadmium

Oral-Water	1	(use with RfD-water: 0.0005 mg/kg-day)
Oral-Diet	1	(use with RfD-food: 0.001 mg/kg-day)
Oral-Soil	1	(use with RfD-food: 0.001 mg/kg-day)
Dermal-Soil	0.04	(use with RfD-food)
Dermal-Water	40	(use with RfD-food)
Inhalation	1	(carcinogenic - use with inhalation CSF: 6.3 $(mg/kg\text{-}day)^{-1}$)

References

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[URL: http://www.epa.gov/region4/waste/oftecser/healthbul.htm]

AAFs FOR CARBAZOLE

The oral CSF for carbazole of 2E-02 $(mg/kg\text{-}day)^{-1}$ provided in HEAST (USEPA, 1997) is based on a dietary study in mice. Due to the lack of chemical-specific information in both mice and humans, it is assumed that absorption is complete (i.e., 100%) and is the same in humans and mice for drinking water, diet, and soil ingestion exposures. Therefore, the AAF (oral-water), AAF (oral-diet), and the AAF (oral-soil) are all (100%)/(100%) = 1.

A recommended default value (USEPA, 2000) for organics of 1% absorption from dermal exposures to soil and sediment has been used. Thus the AAF (dermal-soil/sediment) is (1%)/(100%) = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading, swimming, or bathing. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). Thus, the AAF (dermal-water) is (100%)/(100%) = 1.

Summary of AAFs Derived for Carbazole

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.01
Dermal-Water	1

References

USEPA. 1997. Health Effects Assessment Summary Tables (HEAST). PB97-921199.

USEPA. 2000. Region 4 Human Health Risk Assessment Bulletins - - Supplement to RAGS. USEPA Region 4. Atlanta, GA. Update 05/30/00. [URL: http://www.epa.gov/region4/waste/oftecser/healthbul.htm]

AAFs FOR CHLOROBENZENE

The oral RfD for chlorobenzene of 2.0E-02 mg/kg-day provided in IRIS (USEPA, 2000) is based on a study in which dogs were orally given capsules containing chlorobenzene. Limited information is available about the absorption of chlorobenzene. However, it is assumed that gastrointestinal absorption for this compound is complete. Furthermore, it is assumed that absorption is the same in animals and humans for gavage, drinking water, diet and soil or sediment ingestion exposures. Thus the AAF (oral-water), the AAF (oral-diet), and the AAF (oral-soil) are all 1.

A recommended default value for organics of 1% absorption from dermal exposures to soil and sediment (USEPA, 2000) has been used. Thus, the AAF (dermal-soil) is (1%/100%) = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading or swimming. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). For chlorobenzene, the AAF (dermal-water) is 100%/100% = 1.

The inhalation RfD of 5.7E-03 mg/kg-day is based on a chronic inhalation reference concentration of 2.0E-02 mg/m^3 provided in HEAST (USEPA, 1997) derived from a 120-day intermittent inhalation study of rats. It is assumed that the absorption of inhaled chlorobenzene in humans in the environment is the same as in the dose-response study. Thus the AAF (inhalation) is 1.

Summary of AAFs for Chlorobenzene

Oral-water	1
Oral-diet	1
Oral-soil	1
Dermal-soil	0.01
Dermal-water	1
Inhalation	1

References

USEPA. 1997. Health Effects Assessment Summary Tables (HEAST). PB97-921199.

USEPA. 2000. Region 4 Human Health Risk Assessment Bulletins - - Supplement to RAGS. USEPA Region 4. Atlanta, GA. Update 05/30/00.
[URL: http://www.epa.gov/region4/waste/oftecser/healthbul.htm]

USEPA. 2000. Integrated Risk Information System (IRIS).
[URL: http://www.epa.gov/ngispgm3/iris/]

AAFs for CHLOROFORM

The oral CSF for chloroform (6.1E-03 (mg/kg-day)$^{-1}$) is based on a drinking water study in rats. The oral RfD (1E-02 mg/kg-day) is based on a feeding study in dogs with the chloroform in a toothpaste matrix. Both values are provided in IRIS (USEPA, 2000). ATSDR (1988) and USEPA (1984) both report that absorption of chloroform by the gastrointestinal tract is complete regardless of vehicle. Thus, in both cases absorption in the dose-response studies is assumed to be 100%, and the derived AAFs for oral and dermal exposure routes will be the same for evaluating both carcinogenic and noncarcinogenic effects. Therefore, it is assumed that absorption is the same in animals and humans for gavage, drinking water, diet, soil, and sediment ingestion exposures. Thus, the AAF (oral-water), the AAF (oral-diet), and the AAF (oral-soil) are all 1.

ENSR has used a recommended default value for VOCs of 1% for dermal absorption from soil (USEPA, 2000). Thus, the AAF (dermal-soil/sediment) is (1%)/(100%) = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading or swimming. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). For chloroform, the AAF (dermal-water) is (100%)/(100%) = 1.

The inhalation CSF for chloroform (8.1E-02 (mg/kg-day)$^{-1}$) provided in IRIS (USEPA, 2000) is based on a corn oil gavage study in mice. The CSF is defined in units of metabolized dose. Thus, the exposure dose of the risk assessment must be adjusted to a metabolized dose. In this case, the AAF is defined as the fraction of an inhalation exposure dose that is metabolized by humans. Adjusting the exposure dose by multiplying it by this AAF will yield an estimated human metabolized dose. This estimate can be multiplied by the cancer slope factor to yield an estimate of cancer risk.

Experimental data show that humans inhaling chloroform absorb and metabolize it differently than do rodents who receive it by gavage or by drinking water. First, although 100% absorption of chloroform in humans upon inhalation is assumed by USEPA (USEPA, 2000), the uptake of chloroform from inspired air in humans is less than 100%. Astrand and Gamberale (1978) measured the uptake of several fat soluble gases in 45 humans and found that the uptake of the gas into the body approaches zero as the alveolar concentration approaches the concentration in the inspired air. Morgan et al. (1970) found a similar result. In their experiments, they gave humans a single breath of radiolabelled chloroform, which was held for 20 seconds. Subjects were instructed to exhale twice before measurements were taken. Absorption would be expected to be high in such an experiment because the blood chloroform and alveolar concentrations of chloroform were zero. Indeed, 5.5% of the dose was exhaled immediately and 94.5% was taken up. After one hour, 10% of the dose had been exhaled unchanged. Thus, the metabolized dose could have been no higher than 90% and was probably substantially lower due to fat storage.

Retention and metabolism of inhaled chloroform would be expected to be lower in cases of continuous or intermittent exposures, versus the single exposure as studied by Morgan et al. (1970). The net rate of absorption will be reduced as the concentration of chloroform builds up in the blood. This was also demonstrated with exposure of humans to methylene chloride at a constant concentration (Morgan et al., 1970). The concentration in the expired air increased rapidly during the first hour and then plateaued. Thus, after equilibrium had been attained, the rate of absorption was low.

Two studies are available that measured the amount of chloroform retained in the body after continuous exposures. Davidson et al. (1982) reported the results of Lehmann and Hasegawa who measured the retention of chloroform during anaesthetic exposures. The method of analysis was a measurement of chloride in inspired and expired air. The average reported retention was 64% of the administered dose at 20 minutes, which was reported to be an equilibrium value. Retention in this case is a measure of metabolism and storage. Thus, using retention as a surrogate for metabolism will overestimate metabolized dose.

Smith et al. (1973) presented similar data. They measured chloroform in arterial blood and venous blood by a gas chromatographic method. Davidson et al. (1982) calculated from these data that retention was 67%. The average of these two values (65.5%) can be taken as an estimate of the retention of chloroform in humans who are inhaling it continuously or intermittently.

As noted above, human experimental data indicates that approximately 66% of an inhaled dose is retained and therefore that a maximum of 66% of a continuously inhaled dose of chloroform is metabolized. Thus, the AAF (inhalation) for potential carcinogenic effects is 0.66 and exposure doses in risk assessments must be multiplied by 0.66 to convert the exposure dose into an appropriate estimate of the metabolized dose.

The NCEA provides an inhalation RfD for chloroform of 8.6E-05 mg/kg-day, as reported by USEPA Region 9 in its PRG tables (USEPA, 1999). Due to a lack of information on what the value is based on, it is assumed that the AAF (inhalation) for noncarcinogenic effects is 1.

Summary of AAFs for Chloroform

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.01

Dermal-Water	1
Inhalation	0.66 (carcinogenic effects)
	1 (noncarcinogenic effects)

References

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AAFs FOR CIS-1,2-DICHLOROETHYLENE

The oral RfD for cis-1,2-dichloroethylene (1.0E-02 mg/kg-day) is based on an oral gavage study in rats as provided in HEAST (USEPA, 1997). Absorption in the dose-response study is assumed to be 100%. It is assumed that absorption is the same in animals and humans for gavage, drinking water, diet, and soil or sediment ingestion exposures. Thus, the AAF (oral-water), the AAF (oral-diet), and the AAF (oral soil) are all 1.

A recommended default value has been used for VOCs of 1% for dermal absorption from soil (USEPA, 2000). Thus, the AAF (dermal-soil) is (1%/100%) = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading or swimming. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). For cis-1,2-dichloroethylene, the AAF (dermal-water) is (100%)/(100%) = 1.

Summary of AAFs for cis-1,2-Dichloroethylene

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.01
Dermal-Water	1

References

USEPA. 1997. Health Effects Assessment Summary Tables (HEAST). PB97-921199.

USEPA. 2000. Region 4 Human Health Risk Assessment Bulletins - - Supplement to RAGS. USEPA Region 4. Atlanta, GA. Update 05/30/00.
[URL: http://www.epa.gov/region4/waste/oftecser/healthbul.htm]

AAFs FOR COPPER

The oral RfD for copper (3.7E-02 mg/kg-day) is converted from a drinking water standard of 1.3 mg/L, and is based on an oral study with copper sulfate in humans (USEPA, 1997). It is assumed that this was a dietary study and that the absorption from diet is the same as the absorption from drinking water. Thus, the AAF (oral-water) and the AAF (oral-diet) are both 1. It is also assumed that the gastrointestinal absorption from diet and soil is the same. Thus, the AAF (oral-soil) is 1.

The USEPA (USEPA, 2000) recommended default value of 0.1% for dermal absorption of inorganics was assumed for dermal absorption of copper. According to Weber et al. (1969) ingested copper salts are 60% absorbed in humans from the diet. Thus, the AAF (dermal-soil) is 0.1%/60% = 0.002.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading or swimming. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). For copper, the AAF (dermal-water) is (100%)/(60%) = 1.67.

Summary of AAFs for Copper

Oral-water	1
Oral-diet	1
Oral-soil	1
Dermal-soil	0.002
Dermal-water	1.67

References

USEPA. 1997. Health Effects Assessment Summary Tables (HEAST). PB97-921199.

USEPA. 2000. Region 4 Human Health Risk Assessment Bulletins - - Supplement to RAGS. USEPA Region 4. Atlanta, GA. Update 05/30/00. [URL: http://www.epa.gov/region4/waste/oftecser/healthbul.htm]

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AAFs FOR gamma-BHC/delta-BHC

The oral RfD for gamma-BHC of 3E-04 mg/kg-day provided in IRIS (USEPA, 2000) is based on a dietary study in rats. The oral CSF of 1.3E+0 $(mg/kg\text{-}day)^{-1}$ is based on a dietary study in mice. Due to the lack of chemical-specific information in mice, rats and humans, it is assumed that absorption is complete (i.e., 100%) and is the same in humans and mice and rats for drinking water, diet, and soil ingestion exposures. Therefore, the AAF (oral-water), AAF (oral-diet), and the AAF (oral-soil) are all (100%)/(100%) = 1.

A recommended default value (USEPA, 2000) for organics of 1% absorption from dermal exposures to soil and sediment has been used. Thus the AAF (dermal-soil/sediment) is (1%)/(100%) = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading, swimming, or bathing. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). Thus, the AAF (dermal-water) is (100%)/(100%) = 1.

Summary of AAFs for gamma-BHC/delta-BHC

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.01
Dermal-Water	1

References

USEPA. 1997. Health Effects Assessment Summary Tables (HEAST). PB97-921199.

USEPA. 2000. Region 4 Human Health Risk Assessment Bulletins - - Supplement to RAGS. USEPA Region 4. Atlanta, GA. Update 05/30/00.
[URL: http://www.epa.gov/region4/waste/oftecser/healthbul.htm]

USEPA. 2000. Integrated Risk Information System (IRIS).
[URL: http://www.epa.gov/ngispgm3/iris/]

AAFs FOR DIELDRIN

The oral RfD for dieldrin of 5E-05 mg/kg-day is based on a dietary study in rats. The oral CSF for dieldrin of 1.6E+1 $(mg/kg\text{-}day)^{-1}$ is based on a dietary study in mice. Both values are provided in IRIS (USEPA, 2000). Due to the lack of chemical-specific information in mice, rats and humans, it is assumed that absorption is complete (i.e., 100%) and is the same in humans and mice and rats for drinking water, diet, and soil ingestion exposures. Therefore, the AAF (oral-water), AAF (oral-diet), and the AAF (oral-soil) are all (100%)/(100%) = 1.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading, swimming, or bathing. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). Thus, the AAF (dermal-water) is (100%)/(100%) = 1.

The inhalation CSF for dieldrin of 1.6E+1 $(mg/kg\text{-}day)^{-1}$ is based on the oral CSF. Due to the lack of chemical-specific information, it is assumed that the AAF (inhalation) is 1.

Summary of AAFs for Dieldrin

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.01
Dermal-Water	1
Inhalation	1

References

USEPA. 2000. Region 4 Human Health Risk Assessment Bulletins - - Supplement to RAGS. USEPA Region 4. Atlanta, GA. Update 05/30/00. [URL: http://www.epa.gov/region4/waste/oftecser/healthbul.htm]

USEPA. 2000. Integrated Risk Information System (IRIS). [URL: http://www.epa.gov/ngispgm3/iris/]

AAFs FOR ETHYLBENZENE

The oral RfD for ethylbenzene (0.1 mg/kg-day) is based on an olive oil gavage study in rats (USEPA, 2000). It has been reported that rabbits orally administered ethylbenzene excreted between 72% and 92% of the administered dose as metabolites in urine (Owen, 1990). A study in rats found 84% recovery after a single oral dose (ATSDR, 1989). These studies represent minimum estimates of the absorbed dose, so it was assumed that 100% of the gavage dose administered in the dose-response study was absorbed. Furthermore, it was assumed that absorption is the same in animals and humans for gavage, drinking water, diet, and soil or sediment ingestion exposures. Thus, the AAF (oral-water), the AAF (oral-diet), and the AAF (oral-soil) are all 1.

A recommended default value for organics of 1% absorption from dermal exposures to soil and sediment has been used (USEPA, 2000). Thus, the AAF (dermal-soil/sediment) is (1%/100%) = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading or swimming. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). For ethylbenzene, the AAF (dermal-water) is 100%/100% = 1.

The inhalation RfC for ethylbenzene is 1.0 mg/m^3 (IRIS) (USEPA, 2000), which is equivalent to 0.29 mg/kg-day assuming a 70 kg person breathes 20 m^3/day. This RfC is based upon an inhalation assay in rats and rabbits in which developmental toxicity was studied. Limited absorption information for human volunteers exposed by inhalation suggests that, on average, 64% of an inhaled dose is absorbed (USEPA, 1987). A study in rats suggests approximately 44% of a dose is absorbed (USEPA, 1987). However, due to serious limitations in both of these studies, it is assumed that absorption in humans, rats, and rabbits is similar. Therefore, the AAF (inhalation) is 1.

Summary of AAFs for Ethylbenzene

Oral-water	1
Oral-diet	1
Oral-soil	1
Dermal-soil	0.01
Dermal-water	1
Inhalation	1

References

ATSDR (Agency for Toxic Substances and Disease Registry). 1987. Draft Toxicological Profile for Ethylbenzene. ATSDR: Atlanta, GA.

Owen, B.A. 1990. *Literature-Derived Absorption Coefficients for 39 Chemicals via Oral and Inhalation Routes of Exposure.* Reg. Toxicol. Pharmacol. 11:237-252.

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[URL: http://www.epa.gov/region4/waste/oftecser/healthbul.htm]

AAFs FOR HEPTACHLOR

The oral RfD for heptachlor of 5E-04 mg/kg-day provided in IRIS (USEPA, 2000) is based on a dietary study in rats. The oral CSF of 4.5 $(\text{mg/kg-day})^{-1}$ provided in IRIS (USEPA, 2000) is based on a dietary study in mice. Due to the lack of chemical-specific information in mice, rats and humans, it is assumed that absorption is complete (i.e., 100%) and is the same in humans and mice and rats for drinking water, diet, and soil ingestion exposures. Therefore, the AAF (oral-water), AAF (oral-diet), and the AAF (oral-soil) are all (100%)/(100%) = 1.

A recommended default value (USEPA, 2000) for organics of 1% absorption from dermal exposures to soil and sediment has been used. Thus the AAF (dermal-soil/sediment) is (1%)/(100%) = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading, swimming, or bathing. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). Thus, the AAF (dermal-water) is (100%)/(100%) = 1.

The inhalation CSF of 4.5 $(\text{mg/kg-day})^{-1}$ provided in IRIS (USEPA, 2000) is based on the oral CSF mouse dietary study. Due to the lack of chemical-specific information, it is assumed that the AAF (inhalation) is 1.

Summary of AAFs for Heptachlor

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.01
Dermal-Water	1
Inhalation	1

References

USEPA. 2000. Region 4 Human Health Risk Assessment Bulletins - - Supplement to RAGS. USEPA Region 4. Atlanta, GA. Update 05/30/00. [URL: http://www.epa.gov/region4/waste/oftecser/healthbul.htm]

USEPA. 2000. Integrated Risk Information System (IRIS).
[URL: http://www.epa.gov/ngispgm3/iris/]

AAFs FOR HEPTACHLOR EPOXIDE

The oral RfD for heptachlor epoxide of 1.3E-05 mg/kg-day provided in IRIS (USEPA, 2000) is based on a dietary study in dogs. The oral CSF of 9.1 $(mg/kg\text{-}day)^{-1}$ provided in IRIS (USEPA, 2000) is based on a dietary study in mice. Due to the lack of chemical-specific information in mice, dogs and humans, it is assumed that absorption is complete (i.e., 100%) and is the same in humans and mice and dogs for drinking water, diet, and soil ingestion exposures. Therefore, the AAF (oral-water), AAF (oral-diet), and the AAF (oral-soil) are all (100%)/(100%) = 1.

A recommended default value (USEPA, 2000) for organics of 1% absorption from dermal exposures to soil and sediment has been used. Thus the AAF (dermal-soil/sediment) is (1%)/(100%) = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading, swimming, or bathing. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). Thus, the AAF (dermal-water) is (100%)/(100%) = 1.

The inhalation CSF of 9.1 $(mg/kg\text{-}day)^{-1}$ provided in IRIS (USEPA, 2000) is based on the oral CSF mouse dietary study. Due to the lack of chemical-specific information, it is assumed that the AAF (inhalation) is 1.

Summary of AAFs for Heptachlor

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.01
Dermal-Water	1
Inhalation	1

References

USEPA. 2000. Region 4 Human Health Risk Assessment Bulletins - - Supplement to RAGS. USEPA Region 4. Atlanta, GA. Update 05/30/00.
[URL: http://www.epa.gov/region4/waste/oftecser/healthbul.htm]

USEPA. 2000. Integrated Risk Information System (IRIS).
[URL: http://www.epa.gov/ngispgm3/iris/]

AAFs FOR MOLYBDENUM

The oral RfD for molybdenum of 5E-03 mg/kg-day provided in IRIS (USEPA, 2000) is based on a 6-year to lifetime human dietary study, although effects of human ingestion of molybdenum in drinking water have also been studied. It is assumed that absorption of molybdenum is complete and does not differ significantly between drinking water, diet, and soil consumption. Therefore, the AAF (oral-water), AAF (oral-diet), and AAF (oral-soil) are all 1.

A recommended default value (USEPA, 2000) for inorganics of 0.1% absorption from dermal exposures to soil and sediment has been used. Thus the AAF (dermal-soil) is 0.1%/100% = 0.001.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading, swimming, or bathing. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). Thus, the AAF (dermal-water) is (100%)/(100%) = 1.

Summary of AAFs for Molybdenum

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.001
Dermal-Water	1

References

USEPA. 2000. Region 4 Human Health Risk Assessment Bulletins - - Supplement to RAGS. USEPA Region 4. Atlanta, GA. Update 05/30/00. [URL: http://www.epa.gov/region4/waste/oftecser/healthbul.htm]

USEPA. 2000. Integrated Risk Information System (IRIS). [URL: http://www.epa.gov/ngispgm3/iris/]

AAFs FOR NICKEL

These AAFs are appropriate for use with the following dose-response values for nickel:

- The oral Reference Dose (RfD) for soluble nickel salts, which is 2E-02 mg/kg-day (USEPA, 2000)
- The inhalation cancer slope factor (CSF) for nickel refinery dust, which is 8.4E-01 $(mg/kg\text{-}day)^{-1}$ (USEPA, 2000)

Absorption in the Dose-Response Study

The USEPA oral dose-response value for the noncarcinogenic effects of nickel (2E-02 mg/kg-day) is based on a dietary study of nickel sulfate in rats. The RfD is to be used with both subchronic and chronic exposures. The RfD is based on administered dose units. Unfortunately, no detailed studies exist that measure the absorption of nickel from dietary components in the rat or any other laboratory animal. The absorption data for nickel in laboratory animals are limited to absorption from drinking water. Data do exist for absorption of nickel in humans from both drinking water and the diet. Comparison of the absorption of nickel from drinking water between laboratory animals and humans reveals that percent absorption is very similar for both, and that virtually all of the absorbed nickel is rapidly eliminated in the urine (USEPA, 1993). Therefore, for the purposes of developing AAFs for nickel, it will be assumed that the percent absorption of nickel from the diet is the same for humans and laboratory animals, and that urinary excretion is an accurate measurement of the amount absorbed. The absorption of nickel in the diet is discussed below.

<u>Absorption from Diet</u>

USEPA (1993) evaluated three studies where nickel was ingested by humans in food, using a pharmacokinetic model based on rate of urinary excretion (Horak and Sunderman, 1983; McNeeley et al., 1972; Sunderman et al., 1989). Estimated bioavailability of nickel in food ranged from 1.0 to 1.8%. Two additional studies show similar results. Tedeschi and Sunderman (1957) and Nomoto and Sunderman (1970) indicate that human absorption of nickel from diet is 1-2%.

The average of this range (1.5%) is pooled with the USEPA (1993) estimates of 1.0, 1.2, and 1.8, to derive a mean of 1.3%, which is used here as an estimate of absorption of nickel from the diet for both humans and rats.

AAF (Oral-Water)

The AAF (oral-water) is defined as: (absorption of nickel in humans from ingested water) / (absorption of nickel in rats from diet).

In 1993, USEPA performed a case study to determine if there was adequate evidence to support the derivation of a relative bioavailability factor for nickel in food and drinking water that could be used for assessing risks to the general population (USEPA, 1993). Eleven key studies on bioavailability of nickel ingested by humans as well as 8 studies on bioavailability of nickel administered to animals were evaluated using a pharmacokinetic model based on rate of urinary excretion. The conclusion of the case study was that, for non-fasting scenarios, there was no difference between the bioavailability of nickel ingested in water or in food (USEPA, 1993; Ruoff et al., 1994). Total diet, rather than the actual medium of exposure, appears to be more of a determining factor for the uptake of nickel from the GI tract. Therefore, for typical (non-fasting) human exposure scenarios, the bioavailability of nickel ingested in water is approximately equal to the bioavailability of nickel ingested in food. Therefore, the AAF (oral-water) is 1.

AAF (Oral-Diet)

The AAF (oral-diet) is defined as: (absorption in humans from ingested diet) / (absorption in rats from ingested diets). The AAF (oral-diet) of 1.0 is derived below.

Absorption in humans and rodents is assumed to be similar. USEPA (1993) evaluated three studies where nickel was ingested by humans in food, using a pharmacokinetic model based on rate of urinary excretion. Estimated bioavailability of nickel in food ranged from 1.0 to 1.8%.

Two additional studies show similar results. Tedeschi and Sunderman (1957) and Nomoto and Sunderman (1970) indicate that human absorption of nickel from diet is 1-2%. The average of this range (1.5%) is pooled with the USEPA (1993) estimates of 1.0, 1.2, and 1.8 to derive a mean estimate of 1.3%, which is used here as an estimate of the fractional absorption of nickel from diet. Thus, the AAF (oral-diet) is (1.3%)/(1.3%) = 1.

AAF (Oral-Soil)

The AAF (oral-soil) is defined as: (absorption in humans from ingested soil) / (absorption in rats from diet). It is likely that nickel absorption from ingested soil of some types would be less than its absorption from dietary components. However, no studies could be located in the scientific literature to test this hypothesis.

Griffin et al. (1991) have studied the absorption of radiolabelled $^{63}NiCl_2$ present in an aqueous slurry with sand or clay soils. Crl:CD BR rats (4/sex/dose) were administered nickel by iv (2.1 mg/kg), oral gavage of an aqueous solution (2.1 or 21 mg/kg), or oral gavage of an aqueous sandy-loam or clay-loam slurry (2.1 or 21 mg/kg). The nickel containing soils were prepared by mixing a soil sample with an aqueous solution of $^{63}NiCl_2$, allowing the soil to dry, and then resuspending the soil in an aqueous slurry. Blood was collected at intervals up to 48 hours post-dosing and analyzed for ^{63}Ni by liquid scintillation counting. Absorption of nickel was measured based on the area under the blood concentration vs. time curve (AUC), using either the iv group or the aqueous oral gavage group AUC as the comparative standard.

Two points must be considered before evaluating the data in this experiment. First, the concentration of nickel in soil that would support an 2.1 mg/kg-day dose in a 15 kg child assumed to exhibit pica behavior, i.e., ingest 10 g soil/day, would be 3,150 ppm. Likewise, a 21 mg/kg dose is equivalent to exposure to soils that are 31,500 ppm nickel. Because these concentrations span the upper end of the range of concentrations that could be encountered at USS Sites/Facilities, the results for both doses will be considered in the development of the AAF. Second, the method of preparation of nickel-containing soils is unlikely to mimic the physical state of nickel in weathered soils, where it would be expected to be present in complex mineralogical forms. However, since this is the only study available that evaluates nickel absorption from soils, it must be considered.

The results of the study are presented in Table 1. The average per cent absolute absorption for the sand-based soil was 2.95% and was 1.45% for the clay-based soil. The mean absorption for the four groups was 2.2% +/- 0.9%.

Table 1. Data from Griffin et al. (1991) for Nickel

TEST GROUP	ROUTE OF EXPOSURE	DOSE (mg/kg)	ABSOLUTE ABSORPTION*	RELATIVE ABSORPTION**
1	IV	2.1	100	-
2	Oral/Water	2.1	4.45	100
3	Oral/Water	21	5.2	100
4	Oral/Sand	2.1	2.8	65.1
5	Oral/Sand	21	3.1	61.1
6	Oral/Clay	2.1	1.1	26.6
7	Oral/Clay	21	1.8	40.4

* Absolute absorption is relative to iv dose group data.
** Relative absorption is relative to aqueous oral gavage dose group data at the same dose.

The AAF (oral-soil) is defined as the ratio of the absorption from soil to the absorption from diet. The absorption from soil (2.2% +/- 0.9%) is not significantly different from the estimate of the absorption from diet described above (1.3% +/- 0.4%). Thus, gastrointestinal absorption of nickel from soil in rats is the same as the absorption in rats from dietary components. Assuming that absorption of nickel is similar in humans and rodents, the estimate of the AAF (oral-soil) is 1.0.

AAF (Dermal-Soil)

The AAF (dermal-soil) is defined as: (absorption in humans from dermal contact with soil) / (absorption in rats from diet). A recommended default value for inorganics of 0.1 percent for the dermal absorption of nickel from soil (USEPA, 2000) has been used. Assuming that the gastrointestinal absorption of nickel from the dietary study is as estimated by USEPA (1993), Tedeschi and Sunderman (1957), and Nomoto and Sunderman (1970) (e.g., 1.3%), an AAF (dermal-soil) of 0.1%/1.3% = 0.08 is calculated.

AAF (Dermal-Water)

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading or swimming or potable water when bathing. The methodology for quantitating risks posed by these exposure pathways uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. The dose-response value for nickel, however, is based on administered dose. The AAF is used to make an adjustment of the exposure dose by this pathway. Thus, the AAF (dermal-water) is defined as: (100%) / (absorption in rats from ingestion of nickel in diet).

This AAF is derived using the estimate of absorption from diet from Sunderman et al. (1989), Tedeschi and Sunderman (1957) and Nomoto and Sunderman (1970) (1.3%). As above, the gastrointestinal absorption in rats from diet is assumed to be the same as the gastrointestinal absorption in humans from diet. Accordingly, the AAF (dermal-water) is:

AAF (Dermal-Water) = (100%) / (1.3%) = 77.

Summary of AAFs for Nickel

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Water	77
Dermal-Soil	0.08

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AAFs FOR NITROBENZENE

The oral RfD for nitrobenzene of 5E-04 mg/kg-day provided in IRIS (USEPA, 2000) is based on an inhalation study in rats and mice. In the conversion to the oral RfD, USEPA assumed 80% of an inhaled dose was absorbed, thus the oral RfD represents an absorbed dose (i.e., 100% absorption). Due to the lack of chemical-specific information, it is assumed that absorption is complete in humans upon exposure to nitrobenzene in water, soil, and the diet. Therefore, the AAF (oral-water), AAF (oral-diet), AAF (oral-soil) are all 1.

A recommended default value (USEPA, 2000) for organics of 1% absorption from dermal exposures to soil and sediment has been used. Thus the AAF (dermal-soil/sediment) is (1%)/(100%) = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading, swimming, or bathing. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). Thus, the AAF (dermal-water) is (100%)/(100%) = 1.

The inhalation RfC provided in HEAST (USEPA, 1997) for nitrobenzene of 2E-03 mg/m^3 corresponds to an inhalation RfD of 5.7E-04 mg/kg-day. It is based on an inhalation study in mice and rats. Due to the lack of chemical-specific information, it is assumed that the AAF (inhalation) is 1.

Summary of AAFs for Nitrobenzene

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.01
Dermal-Water	1
Inhalation	1

References

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USEPA. 2000. Integrated Risk Information System (IRIS). [URL: http://www.epa.gov/ngispgm3/iris/]

AAFs FOR PENTACHLOROPHENOL

The oral RfD for pentachlorophenol (PCP) (3E-02 mg/kg-day) is provided in IRIS (USEPA, 2000) and is based upon a dietary study in rats. The oral CSF, also provided in IRIS, is 1.2E-01 $(mg/kg\text{-}day)^{-1}$ and is based on a dietary study in mice. Limited studies of absorption have been carried out in several species including humans, rats, and monkeys. Rats and monkeys were given single oral doses in corn oil of 10 mg [^{14}C] PCP/kg and rats were also dosed with 100 mg/kg (Braun and Sauerhoff, 1976; Braun et al., 1977). Absorption was extensive in both species with greater than 90% recovery of the dose in urine, feces, expired air, and tissues. Kinetic analyses were also performed. Essentially complete absorption by rats dosed with PCP or sodium pentachlorophenate in water or food has also been reported (Meerman et al., 1983). Studies in humans indicate ready absorption following oral administration. Based upon these results, it is assumed that absorption in the dose-response study was 100%. Furthermore, it is assumed that absorption is the same in animals and humans for gavage, drinking water, diet, and soil or sediment ingestion exposures. Thus, the AAF (oral-water), the AAF (oral-diet), and the AAF (oral-soil) are all 1.

An assumed default value of 1% absorption for dermal exposures to volatile organics in soil and sediment (USEPA, 2000) has been used here. Thus, the AAF (dermal-soil) is (1%/100%)=0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading or swimming. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). For PCP, the AAF (dermal-water) is 100%/100% = 1.

Summary of AAFs for Pentachlorophenol

Oral-water	1
Oral-diet	1
Oral-soil	1
Dermal-soil	0.01
Dermal-water	1

References

ATSDR. 1989. Toxicological Profile for Pentachlorophenol. (Draft for Public Comment.) ATSDR: Atlanta, Georgia.

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[URL: http://www.epa.gov/ngispgm3/iris/]

AAFs FOR PHENOL

The oral RfD for phenol (6E-01 mg/kg-day) provided in IRIS (USEPA, 2000) is based on a drinking water gavage study in rats. Studies of absorption have been carried out in humans and other species. Phenol is absorbed readily by the oral route in humans (Capel et al., 1972) and in a variety of other mammalian species (ATSDR, 1989). Capel et al. (1972) reported values for urinary recovery of orally administered phenol in humans. Three subjects received a single oral dose of 0.01 mg/kg [^{14}C]phenol. Mean 24-hour urinary recovery of ^{14}C was 85-90% of the administered dose. In this same study, urinary recovery of orally administered [^{14}C]phenol was determined in 18 other mammalian species. Mean 24-hour recoveries of ^{14}C ranged from 95% in the rat to 31% in the squirrel monkey.

Absorption of phenol from the small intestine has been studied in the rat, and appears to be quite rapid in this species. Humphrey et al. (1980) administered ~40 mg/kg [^{14}C]phenol directly into the in situ isolated small intestine of the rat. Absorption kinetics were described as first-order; the apparent absorption half-time was 5.5 $\pm$ 0.05 minutes. In addition, Kao et al. (1979) injected solutions of [^{14}C]phenol into the intact small intestine of anesthetized rats. Two-hour urinary recoveries of ^{14}C were 77.9 $\pm$ 5.8% after a 25 mg/kg dose.

Based upon these results, it is assumed that absorption in the dose-response study was 100%. Furthermore, it is assumed that absorption is the same in animals and humans for gavage, drinking water, diet, and soil or sediment ingestion exposures. Thus, the AAF (oral-water), the AAF (oral-diet), and the AAF (oral-soil) are all 1.

Evidence of dermal absorption of phenol by humans has been reported (ATSDR, 1989). For instance, Pietrowski (1971) performed whole body skin exposures in human subjects. The subjects were exposed to phenol vapor at concentrations of 5, 10, and 25 mg/m^3 for 6 hours. It was concluded that percutaneous absorption is significant compared to inhalation when humans are exposed to phenol vapor.

Others have measured the absorption of pure phenol or phenol solution through skin (ATSDR, 1989). For instance, Baranowska-Dutkiewicz (1981) measured percutaneous absorption of phenol applied in solution (2.5, 5.0, or 10.0 g/L) directly to the forearm of volunteers. Approximately 13% of the applied dose was absorbed in 30 minutes. Such studies do not, however, yield information concerning the degree of dermal absorption of phenol that is adsorbed onto soil or sediment. Because phenol is volatile, much loss to the atmosphere would be expected during skin contact with phenol contaminated soil. Thus, a recommended default value (USEPA, 2000) for organics of 1% absorption from dermal exposures to soil and sediment has been used. Thus the AAF (dermal-soil/sediment) is (1%)/(100%) = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading or swimming. The methodology for quantitating risks posed by this exposure pathway uses a constituent-specific permeability constant that estimates the rate at which the constituent passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). For phenol, the AAF (dermal-water) is 100%/100% = 1.

Summary of AAFs for Phenol

Oral-water	1
Oral-diet	1
Oral-soil	1
Dermal-soil	0.01
Dermal-water	1

References

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AAFs FOR POLYCYCLIC AROMATIC HYDROCARBONS (PAH)

The majority of the information presented below was derived from a paper entitled Absorption Adjustment Factor (AAF) Distributions for Polycyclic Aromatic Hydrocarbons (PAHs) (Magee et al., 1996). This paper is provided as an attachment to this section.

These AAFs are appropriate for use with the following dose-response values for PAH:

- The oral cancer slope factor (CSF) for benzo(a)pyrene (BAP) of 7.3 $(mg/kg\text{-}day)^{-1}$ (USEPA, 2000) and the adjusted CSF for the remaining potentially carcinogenic PAH (cPAH) using the following relative potency factors (USEPA, 1993):

PAH	Relative Potency Factor
Benzo(a)pyrene	1
Benzo(a)anthracene	0.1
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.01
Chrysene	0.001
Dibenzo(a,h)anthracene	1
Indeno(1,2,3-cd)pyrene	0.1

- The inhalation CSF for BAP of 3.1 $(mg/kg\text{-}day)^{-1}$ (USEPA, 1999) and the adjusted CSF for the remaining potentially carcinogenic PAH using the relative potency factors listed above.

- The oral reference doses (RfDs) available from USEPA (2000) for the noncarcinogenic PAHs (ncPAHs): acenaphthene (0.06 mg/kg-day), anthracene (0.3 mg/kg-day), fluoranthene (0.04 mg/kg-day), fluorene (0.04 mg/kg-day), naphthalene (0.02 mg/kg-day) and pyrene (0.03 mg/kg-day).

- The inhalation reference concentration (RfC) available from USEPA (2000) for naphthalene of 3E-3 mg/m^3, which is equivalent to an RFD of 9E-04 mg/kg-day.

Absorption in the Dose-Response Studies

In the studies used to develop the CSF for BAP, BAP was administered in the diet. Corn oil gavage was used to administer doses in the RfD studies. The Magee et al. (1996) paper summarizes studies on the gastrointestinal absorption of PAHs, and develops a point estimate for gastrointestinal absorption in the dose-response studies of 92%, which is the average of 13 data points from six studies.

Oral-Soil AAF

cPAHs. An oral-soil AAF of 0.29 is used for cPAHs. This value is based on a review of six available studies of PAHs performed in vivo, as summarized in Magee et al. (1996). Three studies that evaluated gastrointestinal (oral) absorption of PAHs from a soil matrix (Goon et al., 1991; Rozett at al., 1996; and Weyand et al., 1996) were deemed appropriate for use for developing an oral-soil AAF. The Rozett et al. (1996) study evaluated the bioavailability of pyrene from aged soil from manufactured gas plant residue (coal tar). The oral AAFs based on this study range from 0.07 to 0.76, with an average of 0.26. Weyand et al. (1996) also evaluated the oral bioavailability of pyrene from manufactured gas plant residue. The oral AAFs based on this study range from 0.11 to 0.36, with an average of 0.23. The last study, Goon et al. (1991) evaluated the bioavailability of BAP adsorbed to "aged" soil (clay-based and sand-based soils). These aged soils were treated with BAP and allowed to age 1 to 30 days, and 6 months to 1 year. The oral AAF for clay-based soil is 0.37 and that for sand-based soils is 0.57. A probabilistic (Monte Carlo) analysis, using 12 estimates of the AAF from all three studies, results in a 50th percentile oral-soil AAF of 0.27, with an upper 90th percentile value of 0.57. The Magee et al. (1996) paper recommends the use of a point-estimate oral-soil AAF of 0.29, which is the arithmetic mean of the point estimates used to develop the distribution.

ncPAHs. Magee et al. (1996) states that the oral absorption of cPAH and ncPAH is similar, therefore, it is appropriate to use the value derived above, 0.29, for the risk evaluation for ncPAHs.

Dermal-Soil AAF

cPAHs. A dermal-soil AAF of 0.02 is used for cPAHs. This value is based on the data from two studies (Yang et al., 1989; Wester et al., 1990). Yang et al. (1989) evaluated the percutaneous absorption of BAP from petroleum crude-fortified soils in vivo in rats and in vitro using excised rat skin. Estimates of absorption were made at 24, 48, 72 and 96 hours. In vivo absorption ranged from 1.1% to 9.2%, and in vitro absorption ranged from 1.5% to 8.4%. Wester et al. (1990) evaluated the percutaneous absorption of BAP added to soil (unaged) in vivo in Rhesus monkeys and in vitro using human cadaver skin, both for 24-hour exposures. Absorption in monkey skin ranged from 10.8% to 18.0% with an average of 13.2%. Absorption in human skin ranged from 0.31% to 3.01% and averaged 1.45%. Because the 24+ hour exposures are not directly relevant to human health risk assessment the data points were adjusted to reflect a 12-hour exposure period assuming absorption is linear between 0 and 24 hours. A probabilistic (Monte Carlo) analysis, using the in vivo and in vitro 24-hour data points (four), adjusted for a 12-hour exposure, from both studies, results in a 50th percentile dermal-soil AAF of 0.02, and an upper 90th percentile value of 0.06. The Magee et al. (1996) paper recommends the use of a point-estimate dermal-soil AAF of 0.02, which is the arithmetic mean of the point estimates used to develop the distribution. It should be noted that one of the authors of the Wester et al. (1990) study, and a well recognized expert in dermatotoxicology, Dr. Howard I. Maibach, M.D., believes that human skin in vitro is a better model of human exposures than any in vivo animal model. If the human skin data were used alone, an AAF of 0.015 would result.

ncPAHs. Dermal absorption data for ncPAHs are summarized by Magee et al. (1996). Although the dermal absorption efficiency of ncPAHs varies from 1x to 100x that of BAP, these data are from studies of ncPAHs applied in solution, not in a soil matrix. The authors have applied a uniform distribution for a standard USEPA default uncertainty factor of 10 that ranges from 1 to 10, to the distribution of dermal-soil AAF for cPAHs. A probabilistic (Monte Carlo) analysis results in a 50^{th} percentile dermal-soil AAF of 0.09, and an upper 90^{th} percentile value of 0.36. The Magee et al. (1996) paper recommends a point estimate value of 0.1 for the dermal-soil AAF for ncPAHs.

Oral-Water AAF

The oral-water AAF for ingestion of PAHs in water is derived from the study of Kawamura et al. (1988). Kawamura and co-workers studied the effects of various foods on the absorption of BAP in rats. The absorption ratio was defined as the ratio of the blood levels of BAP and its metabolites at 25 hours after oral dosing compared to the blood levels following an intravenous injection of the BAP. The "absorption ratio" in this study is an example of a relative bioavailability estimate, not a measure of absolute absorption, therefore, these values cannot be compared to the absorption information based on fecal excretion data presented in the Magee et al. (1996) paper. The absorption ratio for a suspension of BAP in water was found to be 25.7% in the Kawamura study. The absorption efficiency observed with solid foods such as cellulose, lignin, bread, rice flake, starch, potato flake, spinach, dried bonito, ovalbumin and soybean oil were observed to be very similar, varying from 20% to 29%, with a mean of 24.3%. The differences in absorption between the foodstuffs and water is not statistically different. BAP was also administered in two oil preparations in this experiment: triolein and soybean oil. The absorption ratios of 50.5% and 39.4%, respectively, were determined to be significantly different from the absorption ratios for the water and foodstuff preparations. The average of these two values is 45%. However, none of the studies reviewed in Magee et al. (1996) observed a difference between absolute absorption of BAP in food and oils (corn, peanut, and olive).

cPAHs. The oral CSF for BAP is derived from rodent feeding studies. Because of the similarity in absorption of BAP from water and food in the Kawamura study, an oral-water AAF of 1.0 is recommended for use in the risk assessment for cPAHs.

ncPAHs. The RfD dose-response studies are all based on corn oil gavage administration. The Kawamura study demonstrates that absorption in oils is greater than absorption in food, and the following AAF can be calculated from this study: 25.7% / 45% = 0.6. However, because this is the only study of several reviewed that observed a difference in absorption between foodstuffs and oils, it will be assumed here that absorption is the same from water, oils and foodstuffs. Therefore, an oral-water AAF of 1.0 is recommended for use in the risk assessment for ncPAHs.

Oral-Diet AAF

The oral CSF and RfDs for PAHs are based on dietary and corn oil gavage studies in mice and rats. Hecht and coworkers (Hecht et al., 1979) fed BAP to both humans and rats and measured the unchanged BAP in the feces to obtain an estimate of the amount of the chemical absorbed. Because unchanged BAP in the feces can be due to absorbed material that is excreted unchanged in the bile, these studies reveal the minimum amount of BAP that was absorbed. It is known, however, that BAP is extensively metabolized. For rats, at least 87% of the BAP was absorbed for a low single dose in peanut oil (0.037 mg/kg) and at least 94% was absorbed for a high single dose in peanut oil (3.7 mg/kg). When rats were fed charcoal-broiled hamburger containing BAP, at least 89% was absorbed. In humans, a high percentage of BAP present in charcoal-broiled meat was also absorbed, because no unchanged BAP was detected in the feces. This study indicates that there is no difference in absorption between two dietary vehicles in rats. That is, absorption of BAP from peanut oil and meat was essentially the same. The results with rats and humans also indicates that there is no major difference in the gastrointestinal absorption of BAP between rats and humans. Therefore, the oral-diet AAF for both cPAHs and ncPAHs is 1.0, i.e., there are assumed to be no differences in absorption, not that absorption is 100%.

Dermal Water AAF

The Magee et al. (1996) paper summarizes studies on the gastrointestinal absorption of PAHs, and develops a point estimate for gastrointestinal absorption in the dose-response studies of 92%. The methodology used to evaluate dermal-water exposures calculates and absorbed dose (i.e., equivalent to 100% absorption). Thus gastrointestinal absorption of 92% is similar to the 100% dermal-water "absorption" for the PAHs. Therefore, a dermal-water AAF of 1 is recommended for use in the risk assessment for both cPAHs and ncPAHs.

Inhalation AAF

<u>cPAHs.</u>

The USEPA inhalation CSF for BaP of 3.1 (mg/kg-day)$^{-1}$ is a provisional value developed by the NCEA (USEPA, 1999); and the derivation of the value is not available. Due to a lack of information, it is assumed that the inhalation AAF is 1.

<u>ncPAHs.</u>

The RfC for naphthalene is based on an inhalation study in mice, where exposure occurred to a naphthalene aerosol. This study is likely to overestimate potential absorption and risk from exposure to naphthalene-containing soil particulates. However, due to lack of specific information, it is assumed that absorption in mice and humans is equivalent; therefore, the inhalation AAF is 1.

Summary of AAFs for PAHs

Oral-Water	cPAHs	1	ncPAHs	1
Oral-Diet	cPAHs	1	ncPAHs	1
Oral-Soil	cPAHs	0.29	ncPAHs	0.29

Dermal-Soil	cPAHs	0.02	ncPAHs	0.1
Inhalation	cPAHs	1	ncPAHs	1

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AAFs FOR POLYCHLORINATED BIPHENYLS (PCB)

The CSFs for PCBs range from 0.04 to 2.0 (mg/kg-day)$^{-1}$ (USEPA, 2000) and are based on the results from five chronic dietary studies in rats (Brunner et al., 1996; Kimbrough et al., 1975; NCI, 1978; Schaeffer et al., 1984; and Norback and Weltman, 1985). Table 1 presents the application of the CSFs to various exposure scenarios.

The current oral RfDs for Aroclor 1016 and Aroclor 1254 are 7.0E-5 mg/kg-day and 2.0E-5 mg/kg-day, respectively. The Aroclor 1016 value is based on critical effects observed in a reproductive bioassay in monkeys that were fed Aroclor 1016 in their diet (Barsottti and van Miller, 1984; Levin et al., 1988; Schantz et al., 1989, 1991). The Aroclor 1254 value is based on monkey clinical and immunologic studies in which the animals were fed gelatin capsules containing Aroclor 1254 in a glycerol: corn oil vehicle (Arnold et al., 1993a,b; Tryphonas et al., 1989, 1991a,b).

Absorption in the Dose-Response Study

Because all of the studies are based on dietary exposures, the AAFs developed below apply to both carcinogenic and non-carcinogenic effects of PCBs. In all of the dose-response studies, various Aroclors were administered in the diet. However, no information on the efficiency of gastrointestinal absorption in those studies was presented. The studies summarized below have been used in the development of AAFs for PCBs. The specific absorption values used in the calculation of the average absorption value are indicated by underlining below.

1. Allen et al. (1975) gave single oral doses of 2,5,2',5'-tetrachlorobiphenyl (18 mg/kg bw) to four adult rhesus monkeys by gastric intubation. PCBs were given in 2.5 ml of corn oil on an empty stomach. Unmetabolized PCBs were analyzed in the feces by gas chromatography (GC). Minimum gastrointestinal absorption was found to be 88%. PCBs found in the feces over specified post-dosing times were presumed to be unabsorbed material. Because PCB metabolites are known to be eliminated in the bile, the possibility exists that some of the PCBs present in the feces were absorbed and then eliminated. As such, only minimum absorption efficiencies can be determined from this and similar studies.

2. Allen et al. (1974) gave single oral doses of PCBs (Aroclor 1248) (1.5 or 3.0 g/kg bw) to two adult rhesus monkeys by gastric intubation. The vehicle was not specified but is presumed to be corn oil. Dosing was done on an empty stomach. Unmetabolized PCBs were analyzed for in feces by GC. Recovery was reported to be high. Minimum gastrointestinal absorption was reported to be 94%.

3. Albro and Fishbein (1972) gave single oral doses of 20 different PCB congeners (5-100 mg/kg bw) and the unabsorbed marker compound, squalene, to CD rats. The mixture was given by stomach tube to unfasted animals who were allowed food and water ad libitum. No vehicle was specified. Although this was not a diet study, per se, it is possible that dietary components

were present in the stomach at the same time as were the test compounds. Minimum gastrointestinal absorption was reported to be 90% for all congeners.

4. Tanabe et al. (1981) gave repeated oral doses of Kanechlors (300, 400, 500, 600) (c.30 mg/kg bw/day x 5 days) to Wistar rats. The dose was given in corn oil. Commercial diet was given ad libitum. No information on the animals' stomach contents was reported. Parent compounds were analyzed in the feces by GC/MS (mass spectrometry). Minimal gastrointestinal absorption was reported to be 85% for total PCB. Cl_5 to Cl_7 congeners had 75-90% absorption.

5. Berlin et al. (1975) gave a single oral dose of 2,4,5,2',5'-pentachlorobiphenyl (7 mg/kg bw) to three CBA mice. The PCBs were given as an aqueous emulsion. No information on the animal's stomach contents was given. Minimal gastrointestinal absorption was reported to be 93%.

6. Van Miller et al. (1975) gave single oral doses (50 mg) of tritiated 2,2',5,5'-tetrachlorobiphenyl to three male Sprague-Dawley rats. The PCB was given by gavage in corn oil. Animals were given food and water ad libitum for 14 days. Urine, feces, and various tissues were analyzed. Over 86% of the radioactivity was present in the excreta as metabolites at 14 days. Thus, minimum gastrointestinal absorption was 86%.

7. Fries et al. (1989) gave four groups of four male Sprague-Dawley rats radiolabeled 2,2',5,5'-tetrachlorobiphenyl in diet or in corn oil (by gavage) or 2,2',4,5,5'-pentachlorobiphenyl in diet or in corn oil (by gavage). The animals given the PCBs by gavage were fed unspiked diet ad libitum. PCBs were administered daily for five days. Rats were then fed unspiked diet for 10 days. Urine and feces were collected. At 15 days, animals were sacrificed, and samples of fat and liver tissue were taken for analysis. The dose of PCBs given was not reported. The amount absorbed was defined as the amount that did not appear in the feces as parent compound. The average absorption of the two congeners when given in a dietary matrix was 89% [(91% + 86%) / 2]. The average absorption of the two congeners when given by corn oil gavage was 88% [(95% + 81%) / 2].

The above seven studies, which involve both rodents and primates and various PCB mixtures and purified congeners, all show that PCBs are very effectively absorbed from the gastrointestinal tract. In the one study (Fries, et al., 1989) in which PCBs were administered by diet, the absorption was shown to be 89%. The other six studies involved the administration of PCBs in various vehicles by gavage. These studies are also relevant to the estimation of the absorption seen in the dose-response studies, because Fries et al. (1989) showed in their rat study that there was no difference in absorption between diet and corn oil gavage. Accordingly, the results from all seven studies were averaged to yield an estimate of 89% for the absorption in the dose-response study.

Oral-Diet AAF

An oral-diet AAF for ingestion of PCBs was derived for intake of dietary constituents. The dose-response studies were all rat dietary studies. There are no studies available on gastrointestinal absorption of PCBs from fish, vegetables, milk, meat, or other human dietary constituents. To be health protective, it is assumed that the absorption of PCBs in humans from various dietary constituents is the same as the dietary absorption that occurs in rats. Thus, the AAF (oral-diet) is 1.0.

Oral-Soil AAF

Fries et al. (1989) gave four groups of four male Sprague-Dawley rats radiolabeled 2,2',5,5'-tetrachlorobiphenyl in diet or in soil or 2,2',4,5,5'-pentachlorobiphenyl in diet or soil. ^{14}C-PCB soil was added to a standard rat diet in meal form at the rate of 5%. In the control experiment, ^{14}C-PCB in acetone was added to the feed. The PCB-soil was a Galestown sandy loam with a pH of 6.7 and which contained 67% sand, 22% silt, 11% clay, and 5% organic matter. Soils had been spilled with PCBs 8 years earlier and were stored at -5°C. At the time of the experiment, fractions passing through a 125 μm sieve were spiked with ^{14}C-PCB for quantitation.

PCBs were administered daily for five days. Rats were then fed unspiked diet for 10 days. Urine and feces were collected. At 15 days, animals were sacrificed, and samples of fat and liver tissue were taken for analysis. The dose of PCB was not reported. The amount absorbed was defined as the amount that did not appear in the feces as parent compound.

The ratio of the amount of PCB absorbed when present as a soil matrix to that absorbed when present as a component of diet is a direct estimate of the oral-soil AAF. From this experiment, AAF estimates are available for two PCB congeners. The oral-soil AAF for the tetrachlorobiphenyl is (80%)/(91%)=0.88, while the estimate for the pentachlorobiphenyl congener is (67%)/(86%)=0.78. These two estimates are averaged [(0.88+0.78)/2] to give an estimate of the AAF (oral-soil) for PCB mixtures of 0.83.

Oral-Water AAF

In the absence of studies of absorption upon ingestion of PCBs in drinking water, it is assumed that the absorption of PCBs in humans from ingestion of water is the same as the dietary absorption that occurred in rats in the dose-response studies. Thus, the AAF (oral-water) is 1.

Dermal-Soil AAF

To derive the AAF (dermal-soil) one needs a value for the efficiency of absorption of soil-bound PCBs through human skin and an estimate of the absorption efficiency from dietary constituents in the dose-response studies. As discussed above, the gastrointestinal absorption of PCBs by rats from diet is estimated to be 89%. As discussed below, dermal PCB absorption in human skin from a soil matrix was determined by Roy et al. (1990) (as reported in USEPA, 1992).

In the study, dermal absorption of 3,3',4,4'-tetrachlorobiphenyl (TCB) was tested at a concentration of 1000 ppm in both low and high organic content soil for rat skin, both in vivo and in vitro, and human skin in vitro (n = 4 or 5). At 96 hours, the total fractional absorption in rats from low organic soil (at a soil application of 10 mg/cm2, and a soil concentration of 1000 ppm) was 50% +/- 11% in vivo and 32% +/- 3% in vitro. Results at intermediate time points were also given for the in vitro experiments.

Absorption was determined in the in vivo experiments by measuring the total amount of the chemical in urine, feces, and tissues. In the in vitro experiments, absorption was determined by measuring the amount of the chemical in the receptor fluid and adding to it the amount measured in the skin after washing. This unremovable material was scored as if it was systemically absorbed. The ratio of absorption in the rat in vivo to that in vitro was 1.6.

Human skin was tested in vitro. Tetrachlorobiphenyl at 1000 ppm was administered to human skin (at a soil application of 6 mg/cm2). At 24 hours, 1.33% +/- 0.47% of the dose was absorbed into the receptor fluid. At 96 hours, 7.36% +/- 2.42% was absorbed (including skin and receptor fluid).

USEPA (1992) has estimated the fractional absorption of TCB from low organic soil in humans in vivo by assuming that the in vivo/in vitro absorption ratio observed in the rat is valid for the human. In addition, the estimate reported above for the 24 hour period was made by adding the fraction of the chemical in the receptor fluid with the amount present in the skin after 96 hours. Thus, USEPA assumed that the fraction of the dose in the skin that could not be removed by washing was constant from 24 to 96 hours, which is reasonable. USEPA's estimate of fractional dermal absorption of PCBs at 1000 ppm in the live human from low organic soil is (1.6) x (1.33%) = 2.1%. USEPA also estimated the 24 hour fractional absorption in live humans from high organic soil to be 0.63%.

In developing its dermal absorption estimate for humans, USEPA considered the range of 0.6% for high organic soil to 2.1% for low organic soil and multiplied the lower estimate by 10 to arrive at its recommended default. In fact, 6% dermal absorption was not observed in any of the five human skin samples until exposure times reached 72 hours or greater. The USEPA's recommended default absorption rate of 6% is not used here, because it is not based on the scientific data.

To be health-protective, the absorption estimate for low organic soil of 2.1%, which may be encountered at various sites, is used for the AAF derivation. In addition, the upper 95% confidence limit of the estimate, which is 3.8%, is used as an additional degree of health-protectiveness. This estimate is an overestimate of the dermal absorption that would be expected at actual sites, because PCB concentrations in soils would, in most cases, be below 1000 ppm, and field measurements have shown that actual soil loadings on skin in humans are quite low (Kissel et al., 1996; USEPA, 1997). Absorption efficiency in such cases would be expected to be lower. In addition, exposure periods would in actuality be less than 24 hours before washing. The estimate of the AAF (dermal-soil) is derived as follows: (absorption of PCB from soil through human skin) / (absorption of PCB in dose-response study) = (3.8%) / (89%) = 0.04.

The absorption efficiency determined above for tetrachlorobiphenyl in soil probably overestimates the dermal absorption efficiency of actual PCB mixtures that contain higher chlorinated congeners. These higher chlorinated species are more likely to have high binding coefficients with organic matter in soil, and they would be less likely to be absorbed through the skin from a soil matrix. However, it is health-protective to use the above data from the soil absorption study with tetrachlorobiphenyl to derive an AAF (dermal-soil) for use with all PCB mixtures.

Dermal-Water AAF

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading, swimming, or bathing. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). Thus, the AAF (dermal-water) is (100%)/(89%) = 1.1.

Inhalation AAF

In the absence of studies of absorption upon inhalation of PCBs, it is assumed that the AAF for this route of exposure is 1.

Summary of Derived AAFs for Polychlorinated Biphenyls (PCBs) for Potentially Carcinogenic and Noncarcinogenic Effects

AAF (oral-water)	1
AAF (oral-diet)	1
AAF (oral-soil)	0.83
AAF (dermal-soil)	0.04
AAF (inhalation)	1

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TABLE 1. TIERS OF CANCER SLOPE FACTORS FOR ENVIRONMENTAL PCBs
HIGH RISK AND PERSISTENCE Upper-bound slope factor: 2.0 $(mg/kg\text{-}day)^{-1}$ Central-estimate slope factor: 1.0 $(mg/kg\text{-}day)^{-1}$
Criteria for use: - Food chain exposure - Sediment or soil ingestion - Dust or aerosol inhalation - Dermal exposure, if an absorption factor has been applied - Presence of dioxin-like, tumor-promoting, or persistent congeners - Early-life exposure (all pathways)
LOW RISK AND PERSISTENCE Upper-bound slope factor: 0.4 $(mg/kg\text{-}day)^{-1}$ Central-estimate slope factor: 0.3 $(mg/kg\text{-}day)^{-1}$
Criteria for use: - Ingestion of water-soluble congeners - Inhalation of evaporated congeners - Dermal exposure if no absorption factor has been applied
LOWEST RISK AND PERSISTENCE Upper-bound slope factor: 0.07 $(mg/kg\text{-}day)^{-1}$ Central-estimate slope factor: 0.04 $(mg/kg\text{-}day)^{-1}$
Criteria for use: Congener or isomer analyses verify that congeners with more than 4 chlorines comprise less than 0.5% of total PCBs.

TETRACHLOROETHENE

The oral RfD (1E-02 mg/kg-day) for tetrachloroethene (PCE) is provided in IRIS (USEPA, 2000) and is based on corn oil gavage studies in mice. The NCEA provides an oral CSF for PCE of 5.2E-02 $(mg/kg\text{-}day)^{-1}$ as cited in the USEPA Region 9 PRGs (USEPA, 1999), although they do not provide the basis for the value. The U.S. EPA (1985) reports that absorption of PCE by the gastrointestinal tract is complete regardless of vehicle. Thus, absorption in the dose-response study is assumed by ENSR to be 100%. Based on this information and other absorption information on other volatile organic compounds, it is has assumed that absorption is the same in animals and humans for gavage, drinking water, diet, and soil or sediment ingestion exposures. Thus, the oral-water AAF, the oral-diet AAF, and the oral-soil AAF are all 1.

A recommended default value for VOCs of 1% was assumed for dermal absorption of tetrachloroethylene from soil (USEPA, 2000). Thus, the AAF (dermal-soil) is (1%/100%) = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading or swimming. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). For PCE, the AAF (dermal-water) is (100%)/(100%) = 1.0.

The NCEA, as reported in the USEPA Region 9 PRG Table (USEPA, 1999) provides an inhalation RfD of 1.14E-01 mg/kg-day and an inhalation CSF of 2E-03 $(mg/kg\text{-}day)^{-1}$ for PCE. Due to the lack of chemical-specific information, it is assumed that the AAF (inhalation) is 1.

Summary of AAFs for Tetrachloroethene

Oral-water	1
Oral-diet	1
Oral-soil	1
Dermal-soil	0.01
Dermal-water	1
Inhalation	1

References

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AAFs FOR TOLUENE

The oral reference dose for toluene (2E-01 mg/kg-day) provided in IRIS (USEPA, 2000) is based on a 13 week rat gavage study. According to the USEPA (1984), the gastrointestinal absorption of toluene is 100%. Therefore, it is assumed that absorption is the same in animals and humans for gavage, drinking water, diet, and soil ingestion exposures. Thus, the AAFs (oral-water), (oral-diet), and (oral-soil/sediment) are all 1.

A recommended default value for organics of 1% for dermal absorption of toluene from soil (USEPA, 2000) has been used. Thus, the AAF (dermal-soil) is (1%/100%)=0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading or swimming. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). For toluene, the AAF (dermal-water) is (100%)/(100%) = 1.

The inhalation RfC for toluene is 0.4 mg/m^3, which is equivalent to an inhalation RfD of 1.14E-01 mg/kg-day, assuming a 70 kg person breathes 20 m^3/day of air. This RfC is based upon an occupational inhalation study in humans. Since both the study used to derived the RfC and the exposure pathway of concern are inhalation of toluene by humans, the AAF (inhalation) is 1.

Summary of AAFs for Toluene

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.01
Dermal-Water	1
Inhalation	1

References

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AAFs FOR TRICHLOROETHENE

Dose-response values for trichloroethylene (TCE) are provided by the NCEA, as reported in the USEPA Region 9 PRG Table (USEPA, 1999). The oral RfD of 6E-03 mg/kg-day is based on a mouse drinking water study.

The oral CSF for TCE (1.1E-02 $(mg/kg\text{-}day)^{-1}$) is based on four separate gavage studies in mice (USEPA, 1983, 1987). This value is expressed in terms of an administered dose after adjusting for metabolism. Trichloroethene is an uncharged, nonpolar and highly lipophilic compound and is consequently expected to readily cross the gastrointestinal mucosal barrier by passive diffusion. Studies in rats showed 90 to 95 percent recovery of labeled trichloroethene in expired air and urine, suggesting virtually complete absorption by the route (USEPA, 1983). It was assumed therefore that absorption in the dose-response studies is 100%.

AAF (Oral)

In man, absorption through the gastrointestinal mucosa is extensive, as documented by the numerous cases of poisoning by oral ingestion of large amounts of TCE reported over the years (USEPA, 1983). It is assumed that 100% oral absorption occurs through drinking water, diet, sediment and soil exposures. Thus the AAF (oral-water), the AAF (oral-diet), and the AAF (oral-soil) are all 1 (100%/100%).

AAF (Dermal)

A recommended default value for VOCs of 1% for dermal absorption of organics from soil has been used (USEPA, 2000). Thus, the AAF (dermal-soil) is 1%/100% = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading or swimming. The methodology for quantifying risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. The dose-response value, however, is based on an administered dose. The AAF (dermal-water) is defined as (100%)/(absorption from the dose-response study). Since a 100% absorption was assumed from the dose-response study, the AAF (dermal-water) is 1.

AAF (Inhalation)

The inhalation CSF for trichloroethene provided by NCEA as reported in the USEPA Region 9 PRG Tables is (6.0E-3 $(mg/kg\text{-}day)^{-1}$). Based on the lack of chemical-specific information, it is assumed that the AAF (inhalation) is 1.

Summary of AAFs for Trichloroethene

Oral-Water	1
Oral-Diet	1
Oral-Soil	1
Dermal-Soil	0.01
Dermal-Water	1
Inhalation	1

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AAFs FOR VANADIUM

The oral RfD of 7E-03 mg/kg-day provided by HEAST (USEPA, 1997) is based on a drinking water study in rats using vanadium sulfate. Vanadium is very poorly absorbed across the gastrointestinal tract with several investigators reporting between 0.1% and greater than 18% absorption of ingested vanadium given in different forms (USEPA, 1987). Based on these studies and absorption for other metals, absorption of 10% was assumed for vanadium. It is assumed that the absorption of vanadium in the diet, water, soil, and sediment is the same as that in the dose-response study. Thus, the AAF (oral-diet), the AAF (oral-soil), and the AAF (oral-water) are all 1.

Dermal absorption of vanadium is assumed to be poor, although specific estimates were not located (USEPA, 1987). A recommended default value for inorganics of 0.1% for the dermal absorption of inorganics from soil (USEPA, 2000) has been used. Assuming that the gastrointestinal absorption of vanadium from the drinking water study was 10%, results in a AAF (dermal-soil/sediment) of *0.1%/10% = 0.01*.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading or swimming. The methodology for quantifying risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make adjustment to the absorbed dermal dose, rather than adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). For vanadium, the AAF (dermal-water) is 100%/10% = 10.

Summary of AAFs for Vanadium

Oral-water	1
Oral-diet	1
Oral-soil	1
Dermal-soil	0.01
Dermal-water	10

References

USEPA. 1987. Health Effects Assessment for Vanadium and Compounds. Environmental Criteria and Assessment Office: Cincinnati, OH. PB 88-176383.

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AAFs FOR VINYL CHLORIDE

The oral RfD for vinyl chloride of 3E-03 mg/kg-day provided in IRIS (USEPA, 2000) is based on a dietary study in rats. The oral cancer slope factor for vinyl chloride is 7.2E-01 $(mg/kg\text{-}day)^{-1}$ for adult exposures. It is also based on a dietary study in rats. According to the ATSDR (1991), vinyl chloride absorption in the GI tract is rapid and virtually complete in rats. It is assumed that 100% absorption occurs in rats and humans for oral exposures to vinyl chloride in water, diet, and soils. Thus, the AAF (oral-water), AAF (oral-diet), and AAF (oral-soil) are all (100%)/(100%) = 1.

A recommended default value of 1% for organics was assumed for dermal absorption of vinyl chloride from soil and sediment (USEPA, 2000). Thus the AAF (dermal-soil) is (1%)/(100%) = 0.01.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading or swimming. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). For vinyl chloride, the AAF (dermal-water) is (100%)/(100%) = 1.0.

The inhalation cancer unit risk is 4.4E-06 $(\mu g/m^3)^{-1}$, as provided by IRIS (USEPA, 2000), and is equivalent to a CSF of 1.54E-02 $(mg/kg/day)^{-1}$. It is based on an inhalation study in rodents. Since exposure in the study used to derive the risk values and the human pathway of concern is inhalation, and since absorption was taken into account in the derivation of the risk values, the AAF (inhalation) for carcinogenic effects is 1. The inhalation RfC for vinyl chloride is 1E-01 mg/m^3 provided by IRIS (USEPA, 2000), which is equivalent to an inhalation RfD of 2.86E-02 mg/kg-day. It is based on the rat dietary study used to develop the oral RfD. It is assumed that absorption is complete via the diet and inhalation. Thus, the AAF (inhalation) for noncarcinogenic effects is 1.

Summary of AAFs for Vinyl Chloride

Oral-water	1
Oral-diet	1
Oral-soil	1
Dermal-soil	0.01
Dermal-water	1
Inhalation	1

References

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AAFs FOR ZINC

The oral RfD for zinc (3.0E-01 mg/kg-day) provided by IRIS (USEPA, 2000) is based on a human study with zinc sulfate in the diet. Thus, the AAF (oral-diet) is 1. The mean absorption of zinc from diet in ten humans has been determined by Sandstrom et al. (1987) as 33% (22-46%). The absorption of zinc from drinking water was determined in humans by several workers: 56% (Dinsmore et al., 1985), 42% (Milman et al., 1983), 58% (Farah et al., 1984) and 55% (Valberg et al., 1985). The mean of these four values is 53%. Thus, the AAF (oral-water) is 53%/33% = 1.6. The gastrointestinal absorption of zinc from soil is assumed to be identical to that from diet. Thus, the AAF (oral-soil) is 1. A recommended default value of 0.1% (USEPA, 2000) for inorganics was assumed for dermal absorption of zinc from contact with soil. Thus, the AAF (dermal-soil) is 0.1%/33% = 0.003.

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading or swimming. The methodology for quantitating risks posed by this exposure pathway uses a chemical-specific permeability constant that estimates the rate at which the chemical passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). For zinc, the AAF (dermal-water) is 100%/33% = 3.03.

Summary of AAFs for Zinc

Oral-diet	1
Oral-water	1.6
Oral-soil	1
Dermal-soil	0.003
Dermal-water	3.03

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AAFs for 2,3,7,8-TCDD TEQ

The oral CSF for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) of 1.5E+05 $(\text{mg/kg-day})^{-1}$ in HEAST (USEPA, 1997) is based on a dietary study in rats (Kociba et al., 1978). The diet was prepared by mixing (30 minutes) an acetone solution of TCDD with laboratory chow. The acetone was evaporated yielding a TCDD/diet mixture. TCDD concentration was 0.02 - 2 ppb (0.001 - 0.1 µg/kg-day). No absorption information is given in the Kociba et al. (1978) study.

Absorption in the Dose-Response Study

USEPA has summarized selected information on gastrointestinal absorption of 2,3,7,8-TCDD and related compounds in laboratory animals after a single oral exposure by gavage (USEPA, 2000). Doses ranged between 0.5 and 5000 ug/kg. This range is above the dose range used in the Kociba et al. (1978) study. The administered dose absorbed ranged from 2-90%. The single human study presented estimated 87% absorption from a 0.001 ug/kg 2,3,7,8-TCDD dose administered in corn oil. The average absorption estimated from the six reported studies of chlorinated dibenzodioxins (CDDs) administered at doses less than or equal to 50 ug/kg is 62%. USEPA (2000) notes that "gastrointestinal absorption of TCDD and related compounds is variable, incomplete, and congener– and vehicle-specific."

In a study by Fries and Marrow (1975), however, rats were given TCDD in their diet continuously for 42 days. The total observation period of the experiment was 70 days. Diets were prepared in a similar manner to that used by Kociba et al. (1978). Laboratory chow was mixed with a benzene solution of TCDD and the benzene was evaporated. Two dose levels were used, 7 ppb and 20 ppb, slightly above the dose level used in the Kociba et al. (1978) study. Absorption was reported to be 50-60%.

As the Fries and Marrow (1975) study directly measured absorption from the diet, and the study upon which the CSF for TCDD is based is a dietary study, the Fries and Marrow (1975) data will be used in the AAF determination. For the purposes of AAF derivation, 55% was used as the absorption efficiency in the dose-response study. This absorption estimate is consistent with the estimates of absorption for the single oral gavage studies.

AAF (Oral-Diet)

An AAF (oral-diet) for ingestion of TCDD equivalents was derived for intake of dietary constituents. The dose-response study is a study in which rats were dosed with TCDD in their diet (Kociba, 1978). There are no studies available on gastrointestinal absorption of TCDD by humans from fish, vegetables, milk or other dietary constituents. Using a single human volunteer, Poiger and Schlatter (1986) reported that a minimum of 85% of a dose of TCDD (1 ng/kg) in corn oil was absorbed. This study is not as relevant for AAF derivation, however, because absorption of TCDD from vegetable oil vehicles has been well-documented to exceed the absorption from dietary constituents (USEPA, 1985). Thus, it is assumed that the absorption of TCDD equivalents in humans from various dietary constituents is the same as the dietary absorption that occurred in rats in the Kociba (1978) study. Thus, the AAF (oral-diet) is 1.

AAF (Dermal-Soil)

To derive the AAF (dermal-soil) one needs a value for the efficiency of absorption of soil-bound TCDD through human skin and an estimate of the absorption efficiency from dietary constituents in the Kociba study. As discussed above, the gastrointestinal absorption of TCDD by rats from diet was found to be 55% by Fries and Marrow (1975). USEPA (1992) discusses and analyzes selected information on dermal absorption of TCDD from soil for in vivo and in vitro laboratory animal studies and in vitro studies of human skin specimens. The results of this discussion and analysis, are summarized below.

- The average percent TCDD absorbed from soil for in vivo rat data reported in USEPA (1991; as cited by USEPA, 1992) was 8.0%. USEPA (1992) adjusted this data for human in vivo dermal absorption, resulting in an estimated human dermal absorption of 2.5% of TCDD in soil.
- Dermal absorption of TCDD over 24 hours in rats in vivo ranged from 1.08% (estimated from data in Shu et al., 1988; as cited in USEPA, 1992) to 3.1% (estimated from data in Poiger and Schlatter, 1980; as cited in USEPA, 1992). Adjusting these data for human in vivo absorption, USEPA (1992) estimates that human dermal absorption of TCDD in soil over 24 hours may range from 0.2% to 1%.
- The impacts of high and low organic carbon content in soil on dermal absorption of TCDD was evaluated by Roy et al. (1990; as cited in USEPA, 1992) for both rats and humans. USEPA analysis of the data of Roy et al. estimates that human dermal absorption of TCDD in soil ranges from 0.13% of TCDD in high organic carbon soil to 0.95% of TCDD in low organic carbon soil.

The above discussion indicates that human dermal absorption of TCDD in soil may range from 0.13% to 2.5%. As a conservative measure, and because the Illinois Environmental Protection Agency (IEPA, 1998) default values for fraction organic carbon in soil are relatively low (0.6% in surface soil and 0.2% in subsurface soil), the high end of this range has been utilized in deriving the AAF (dermal-soil). Therefore, the AAF (dermal-soil) is (2.5%)/(55%) = 0.05.

AAF (Oral-Soil)

Data for the bioavailability of TCDD from soil have been summarized by the USEPA (2000). Studies indicate that intestinal absorption of TCDD from soil is approximately half that reported for TCDD administered in corn oil to guinea pigs and rats (McConnel, et al., 1984 and Lucier, et al., 1986; as reported in USEPA 2000). Estimates of bioavailability of TCDD in site soils (i.e., not laboratory prepared soils) range from 0.5% to 43%. Assuming that absorption of TCDD from the diet (as prepared by Kociba et al., 1978) is similar to that from corn oil (i.e., 55% of TCDD in diet or corn oil would be absorbed following oral exposure) it can be inferred that approximately 27.5 % of TCDD in soil may be absorbed following oral exposure. As this absorption estimate more directly compares absorption of TCDD from soil to dietary exposures, it is used here for AAF derivation. Therefore, in this risk assessment, the AAF (oral-soil) is (27.5%)/(55%) = 0.5.

AAF (Dermal-Water)

The AAF (dermal-water) is used when estimating the human risks posed by dermally contacting surface water when wading or swimming. The methodology for quantitating risks posed by this exposure pathway uses a constituent-specific permeability constant that estimates the rate at which the constituent passes into and through the skin from an aqueous solution. By definition, the dose estimated by this procedure is an absorbed dose. Most dose-response criteria, however, are based on administered doses. An adjustment is necessary to account for the absorption in the dose-response study. In order to use consistent dose-response criteria across all exposure pathways, the AAF is used to make an adjustment to the absorbed dermal dose, instead of adjusting the dose-response criteria. Here, the AAF is defined as (100%)/(estimated absorption in the dose-response study). For dioxin, the AAF (dermal-water) is (100%)/(55%) = 1.8.

AAF (Oral-Water)

ENSR assumes that the absorption of TCDD equivalents in humans from ingestion of water is the same as the dietary absorption that occurred in rats in the Kociba (1978) study. Thus, the AAF (oral-water) is 1.

AAF (Inhalation)

The USEPA has developed a unit risk for inhaled dioxin from the oral CSF. In so doing, USEPA assumed that 100% of the particles estimated to be retained in the lung are absorbed. It is assumed in this risk assessment that the absorption of TCDD from inhalation of air is the same as that assumed by the USEPA in developing the unit risk factor. Thus, the AAF (inhalation) is 1.

Summary of AAFs for TCDD

Oral-Water	1
Oral-Diet	1
Oral-Soil	0.5
Dermal-Soil	0.05
Dermal-Water	1.8

Inhalation 1

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APPENDIX P

RISK CALCULATION SPREADSHEETS

APPENDIX P
RISK CALCULATION SPREADSHEETS

Indoor Industrial Worker

- RME Indoor Air
- MLE Indoor Air

Outdoor Industrial Worker

- RME Surface Soil
- RME Outdoor Air (Particulates)
- RME Outdoor Air (VOC)
- MLE Surface Soil
- MLE Outdoor Air (Particulates)
- MLE Outdoor Air (VOC)

Construction Worker

- RME Soil
- RME Outdoor Air (Particulates)
- RME Groundwater
- RME Outdoor Air (Trench Air)
- MLE Soil
- MLE Outdoor Air (Particulates)
- MLE Groundwater
- MLE Outdoor Air (Trench Air)

Trespassing Teenager

- RME Surface Soil
- RME Outdoor Air (Particulates)
- RME Outdoor Air (VOC)
- MLE Surface Soil
- MLE Outdoor Air (Particulates)
- MLE Outdoor Air (VOC)

Recreational Teen

- RME Sediment
- MLE Sediment

Recreational Fisher

- RME Sediment
- RME Fish Tissue
- MLE Sediment
- MLE Fish Tissue

Resident

- RME-Surface Soil
- RME Outdoor Air (Particulates)
- RME Produce
- MLE-Surface Soil
- MLE Outdoor Air (Particulates)
- MLE Produce

Receptors Evaluated:	
Receptor 1:	RME Indoor Industrial Worker

ASSUMPTIONS FOR INHALATION OF	INDOOR WORKER -RME INDOOR AIR	Assumed Value	Units	Calculated Value
Inhalation Rate	RME Indoor Industrial Worker	1.6	(m^3 air/hour)	
Body Weight	RME Indoor Industrial Worker	70	(kg)	
Exposure Time	RME Indoor Industrial Worker	8	(hrs/day) =	8.00E+00
Exposure Frequency	RME Indoor Industrial Worker	250	(days)/365 (days) =	6.85E-01
Exposure Duration (cancer)	RME Indoor Industrial Worker	25	(yrs)/70(yrs) =	3.57E-01
Exposure Duration (noncancer)	RME Indoor Industrial Worker	25	(yrs)/25(yrs) =	1.00E+00
Lifetime		70	(years)	

Constituent	Unit Concentration In Air (mg/m^3 air)	Inhalation Absorption Adjustment Factor	Inhalation Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	ADDinh Indoor Industrial Worker (mg/kg-day)	Lifetime Average Daily Dose - Inh. (mg/kg-day)	Excess Lifetime Cancer Risk - Inhalation
1,1,2,2-Tetrachloroethane	1.00E+00	1	2.03E-01	4.47E-02	4.47E-02	9.08E-03
4-Methyl-2-pentanone	1.00E+00	NA	NA	NA	NA	NC
Benzene	1.00E+00	1	7.70E-03	4.47E-02	4.47E-02	3.44E-04
Chlorobenzene	1.00E+00	NA	NA	NA	NA	NC
Chloroform	1.00E+00	0.66	8.05E-02	2.95E-02	2.95E-02	2.38E-03
Ethylbenzene	1.00E+00	NA	NA	NA	NA	NC
Naphthalene	1.00E+00	NA	NA	NA	NA	NC
Tetrachloroethene	1.00E+00	1	2.00E-03	4.47E-02	4.47E-02	8.95E-05
Toluene	1.00E+00	NA	NA	NA	NA	NC
Trichloroethene	1.00E+00	1	6.00E-03	4.47E-02	4.47E-02	2.68E-04
Vinyl chloride	1.00E+00	1	1.54E-02	4.47E-02	4.47E-02	6.89E-04

TABLE
POTENTIAL CARCINOGENIC RISK
CARCINOGENIC ASSESSMENT
INHALATION OF
INDOOR AIR
INDOOR WORKER -RME

Constituent	Reference Risk (per mg/m3)	Fill Area G (a)		Fill Area H (a)		Fill Area I (a)		Fill Area L (a)	
		EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk
1,1,2,2-Tetrachloroethane	9.08E-03	--	NC	5.79E-07	5.26E-09	--	NC	--	NC
4-Methyl-2-pentanone	NC	4.20E-04	NC	--	NC	--	NC	--	NC
Benzene	3.44E-04	1.98E-03	6.82E-07	1.23E-03	4.24E-07	3.98E-04	1.37E-07	2.38E-05	8.20E-09
Chlorobenzene	NC	1.35E-03	NC	1.41E-03	NC	2.71E-03	NC	--	NC
Chloroform	2.38E-03	--	NC	1.89E-04	4.49E-07	--	NC	3.34E-05	7.94E-08
Ethylbenzene	NC	--	NC	9.90E-04	NC	--	NC	--	NC
Naphthalene	NC	1.01E-04	NC	1.16E-04	NC	--	NC	--	NC
Tetrachloroethene	8.95E-05	1.89E-04	1.69E-08	--	NC	--	NC	--	NC
Toluene	NC	4.70E-03	NC	--	NC	--	NC	--	NC
Trichloroethene	2.68E-04	1.58E-04	4.24E-08	4.01E-05	1.08E-08	1.41E-04	3.78E-08	--	NC
Vinyl chloride	6.89E-04	1.17E-04	8.06E-08	--	NC	2.76E-03	1.90E-06	--	NC
	Total:		8.22E-07		8.89E-07		2.08E-06		8.76E-08

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
NC - Not Calculated.
(a) - Maximum indoor air EPC from this area.

P-6

Constituent	Unit Concentration In Air (mg/m^3 air)	Inhalation Absorption Adjustment Factor	Inhalation Reference Dose (mg/kg-day)	ADDinh Industrial Worker (mg/kg-day)	Chronic Average Daily Dose-inh (mg/kg-day)	Hazard Index - Inhalation
1,1,2,2-Tetrachloroethane	1.00E+00	NA	NA	NA	NA	NC
4-Methyl-2-pentanone	1.00E+00	1	2.29E-02	1.25E-01	1.25E-01	5.48E+00
Benzene	1.00E+00	1	1.70E-03	1.25E-01	1.25E-01	7.37E+01
Chlorobenzene	1.00E+00	1	5.71E-03	1.25E-01	1.25E-01	2.19E+01
Chloroform	1.00E+00	1	8.60E-05	1.25E-01	1.25E-01	1.46E+03
Ethylbenzene	1.00E+00	1	2.86E-01	1.25E-01	1.25E-01	4.38E-01
Naphthalene	1.00E+00	1	8.57E-04	1.25E-01	1.25E-01	1.46E+02
Tetrachloroethene	1.00E+00	1	1.14E-01	1.25E-01	1.25E-01	1.10E+00
Toluene	1.00E+00	1	1.14E-01	1.25E-01	1.25E-01	1.10E+00
Trichloroethene	1.00E+00	NA	NA	NA	NA	NC
Vinyl chloride	1.00E+00	1	2.86E-02	1.25E-01	1.25E-01	4.38E+00

TABLE
POTENTIAL HAZARD INDEX
NONCARCINOGENIC ASSESSMENT
INHALATION OF
INDOOR AIR
INDOOR WORKER -RME

Constituent	Reference HQ (per mg/m3)	Fill Area G (a)		Fill Area H (a)		Fill Area I (a)		Fill Area L (a)	
		EPC (mg/m3)	HQ	EPC (mg/m3)	HQ	EPC (mg/m3)	HQ	EPC (mg/m3)	HQ
1,1,2,2-Tetrachloroethane	NC	--	NC	5.79E-07	NC	--	NC	--	NC
4-Methyl-2-pentanone	5.48E+00	4.20E-04	2.30E-03	--	NC	--	NC	--	NC
Benzene	7.37E+01	1.98E-03	1.46E-01	1.23E-03	9.06E-02	3.98E-04	2.93E-02	2.38E-05	1.75E-03
Chlorobenzene	2.19E+01	1.35E-03	2.96E-02	1.41E-03	3.09E-02	2.71E-03	5.94E-02	--	NC
Chloroform	1.46E+03	--	NC	1.89E-04	2.75E-01	--	NC	3.34E-05	4.86E-02
Ethylbenzene	4.38E-01	--	NC	9.90E-04	4.34E-04	--	NC	--	NC
Naphthalene	1.46E+02	1.01E-04	1.48E-02	1.16E-04	1.69E-02	--	NC	--	NC
Tetrachloroethene	1.10E+00	1.89E-04	2.08E-04	--	NC	--	NC	--	NC
Toluene	1.10E+00	4.70E-03	5.16E-03	--	NC	--	NC	--	NC
Trichloroethene	NC	1.58E-04	NC	4.01E-05	NC	1.41E-04	NC	--	NC
Vinyl chloride	4.38E+00	1.17E-04	5.13E-04	--	NC	2.76E-03	1.21E-02	--	NC
	Total HI:		**1.98E-01**		**4.14E-01**		**1.01E-01**		**5.04E-02**

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated.
(a) - Maximum indoor air EPC from this area.

P-8

SAUGET AREA 1 - EE/CA AND RI/FS
MLE

Receptors Evaluated:	
Receptor 1:	MLE Indoor Industrial Worker

ASSUMPTIONS FOR INDOOR WORKER -MLE INHALATION OF INDOOR AIR		Assumed Value	Units	Calculated Value
Inhalation Rate	MLE Indoor Industrial Worker	1.0	(m^3 air/hour)	
Body Weight	MLE Indoor Industrial Worker	70	(kg)	
Exposure Time	MLE Indoor Industrial Worker	8	(hrs/day) =	8.00E+00
Exposure Frequency	MLE Indoor Industrial Worker	250	(days)/365 (days) =	6.85E-01
Exposure Duration (cancer)	MLE Indoor Industrial Worker	7	(yrs)/70(yrs) =	1.00E-01
Exposure Duration (noncancer)	MLE Indoor Industrial Worker	7	(yrs)/7(yrs) =	1.00E+00
Lifetime		70	(years)	

P-9

Constituent	Unit Concentration In Air (mg/m³ air)	Inhalation Absorption Adjustment Factor	Inhalation Cancer Slope Factor (mg/kg-day)⁻¹	ADDinh Indoor Industrial Worker (mg/kg-day)	Lifetime Average Daily Dose - Inh. (mg/kg-day)	Excess Lifetime Cancer Risk - Inhalation
1,1,2,2-Tetrachloroethane	1.00E+00	1	2.03E-01	7.83E-03	7.83E-03	1.59E-03
4-Methyl-2-pentanone	1.00E+00	NA	NA	NA	NA	NC
Benzene	1.00E+00	1	7.70E-03	7.83E-03	7.83E-03	6.03E-05
Chlorobenzene	1.00E+00	NA	NA	NA	NA	NC
Chloroform	1.00E+00	0.66	8.05E-02	5.17E-03	5.17E-03	4.16E-04
Ethylbenzene	1.00E+00	NA	NA	NA	NA	NC
Naphthalene	1.00E+00	NA	NA	NA	NA	NC
Tetrachloroethene	1.00E+00	1	2.00E-03	7.83E-03	7.83E-03	1.57E-05
Toluene	1.00E+00	NA	NA	NA	NA	NC
Trichloroethene	1.00E+00	1	6.00E-03	7.83E-03	7.83E-03	4.70E-05
Vinyl chloride	1.00E+00	1	1.54E-02	7.83E-03	7.83E-03	1.21E-04

TABLE
POTENTIAL CARCINOGENIC RISK
CARCINOGENIC ASSESSMENT
INHALATION OF
INDOOR AIR
INDOOR WORKER -MLE

Constituent	Reference Risk (per mg/m3)	Fill Area G (a)		Fill Area H (a)		Fill Area I (a)		Fill Area L (a)	
		EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk
1,1,2,2-Tetrachloroethane	1.59E-03	--	NC	2.24E-07	3.56E-10	--	NC	--	NC
4-Methyl-2-pentanone	NC	4.20E-05	NC	--	NC	--	NC	--	NC
Benzene	6.03E-05	4.45E-04	2.68E-08	4.45E-04	2.68E-08	1.33E-04	8.02E-09	4.21E-06	2.54E-10
Chlorobenzene	NC	1.43E-04	NC	3.88E-04	NC	4.80E-04	NC	--	NC
Chloroform	4.16E-04	--	NC	4.72E-05	1.96E-08	--	NC	6.49E-06	2.70E-09
Ethylbenzene	NC	--	NC	2.42E-04	NC	--	NC	--	NC
Naphthalene	NC	1.07E-05	NC	2.52E-05	NC	--	NC	--	NC
Tetrachloroethene	1.57E-05	2.24E-05	3.51E-10	1.43E-05	2.24E-10	--	NC	--	NC
Toluene	NC	4.67E-04	NC	--	NC	--	NC	--	NC
Trichloroethene	4.70E-05	1.62E-05	7.61E-10	--	NC	2.26E-05	1.06E-09	--	NC
Vinyl chloride	1.21E-04	2.43E-05	2.93E-09	--	NC	4.18E-04	5.04E-08	--	NC
	Total:		3.09E-08		4.70E-08		5.95E-08		2.95E-09

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
NC - Not Calculated.
(a) - Indoor air EPC calculated from average groundwater concentration in this area.

P-11

Constituent	Unit Concentration In Air (mg/m³ air)	Inhalation Absorption Adjustment Factor	Inhalation Reference Dose (mg/kg-day)	ADDinh Industrial Worker (mg/kg-day)	Chronic Average Daily Dose-inh (mg/kg-day)	Hazard Index - Inhalation
1,1,2,2-Tetrachloroethane	1.00E+00	NA	NA	NA	NA	NC
4-Methyl-2-pentanone	1.00E+00	1	2.29E-02	7.83E-02	7.83E-02	3.42E+00
Benzene	1.00E+00	1	1.70E-03	7.83E-02	7.83E-02	4.60E+01
Chlorobenzene	1.00E+00	1	5.71E-03	7.83E-02	7.83E-02	1.37E+01
Chloroform	1.00E+00	1	8.60E-05	7.83E-02	7.83E-02	9.10E+02
Ethylbenzene	1.00E+00	1	2.86E-01	7.83E-02	7.83E-02	2.74E-01
Naphthalene	1.00E+00	1	8.57E-04	7.83E-02	7.83E-02	9.13E+01
Tetrachloroethene	1.00E+00	1	1.14E-01	7.83E-02	7.83E-02	6.87E-01
Toluene	1.00E+00	1	1.14E-01	7.83E-02	7.83E-02	6.87E-01
Trichloroethene	1.00E+00	NA	NA	NA	NA	NC
Vinyl chloride	1.00E+00	1	2.86E-02	7.83E-02	7.83E-02	2.74E+00

TABLE
POTENTIAL HAZARD INDEX
NONCARCINOGENIC ASSESSMENT
INHALATION OF
INDOOR AIR
INDOOR WORKER -MLE

Constituent	Reference HQ (per mg/m3)	Fill Area G (a)		Fill Area H (a)		Fill Area I (a)		Fill Area L (a)	
		EPC (mg/m3)	HQ	EPC (mg/m3)	HQ	EPC (mg/m3)	HQ	EPC (mg/m3)	HQ
1,1,2,2-Tetrachloroethane	NC	--	NC	2.24E-07	NC	--	NC	--	NC
4-Methyl-2-pentanone	3.42E+00	4.20E-05	1.44E-04	--	NC	--	NC	--	NC
Benzene	4.60E+01	4.45E-04	2.05E-02	4.45E-04	2.05E-02	1.33E-04	6.12E-03	4.21E-06	1.94E-04
Chlorobenzene	1.37E+01	1.43E-04	1.96E-03	3.88E-04	5.32E-03	4.80E-04	6.58E-03	--	NC
Chloroform	9.10E+02	--	NC	4.72E-05	4.30E-02	--	NC	6.49E-06	5.91E-03
Ethylbenzene	2.74E-01	--	NC	2.42E-04	6.62E-05	--	NC	--	NC
Naphthalene	9.13E+01	1.07E-05	9.77E-04	2.52E-05	2.30E-03	--	NC	--	NC
Tetrachloroethene	6.87E-01	2.24E-05	1.54E-05	1.43E-05	9.82E-06	--	NC	--	NC
Toluene	6.87E-01	4.67E-04	3.21E-04	--	NC	--	NC	--	NC
Trichloroethene	NC	1.62E-05	NC	--	NC	2.26E-05	NC	--	NC
Vinyl chloride	2.74E+00	2.43E-05	6.66E-05	--	NC	4.18E-04	1.15E-03	--	NC
Total HI:			**2.40E-02**		**7.11E-02**		**1.38E-02**		**6.10E-03**

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated.
(a) - Indoor air EPC calculated from average groundwater concentration in this area.

SAUGET AREA 1 - EE/CA AND RI/FS
RME

Receptors Evaluated	
Receptor 3:	*RME Outdoor Worker*

ASSUMPTIONS FOR OUTDOOR WORKER RME INCIDENTIAL INGESTION AND DERMAL CONTACT SURFACE SOIL		Assumed Value	Units	Calculated Value
Soil Ingestion Rate	RME Outdoor Worker	50	(mg soil/day)	
Soil on Skin	RME Outdoor Worker	0.02	(mg/cm^2)	
Skin Exposed	RME Outdoor Worker	3339	(cm^2)	
Body Weight	RME Outdoor Worker	70	(kg)	
Exposure Frequency	RME Outdoor Worker	190	(days)/365(days) =	5.21E-01
Exposure Duration (cancer)	RME Outdoor Worker	25	(years)/70(years) =	3.57E-01
Exposure Duration (noncancer)	RME Outdoor Worker	25	(yrs)/25(yrs) =	1.00E+00
Lifetime		70	(years)	
Unit Conversion Factor		1.00E-06	(kg/mg)	

22-Dec-00

P-14

SAUGET AREA 1 - EE/CA AND RI/FS
RME
POTENTIAL CARCINOGENIC RISK
INCIDENTIAL INGESTION AND DERMAL CONTACT
SURFACE SOIL
OUTDOOR WORKER RME

Constituent	Unit Concentration in Soil (mg/kg soil)	Oral - Soil Absorption Adjustment Factor	Dermal - Soil Absorption Adjustment Factor	Oral Cancer Slope Factor (mg/kg-day)$^{-1}$	ADDing RME Outdoor Worker (mg/kg-day)	Lifetime Average Daily Dose-Ing. (mg/kg-day)	ADDder RME Outdoor Worker (mg/kg-day)	Lifetime Average Daily Dose-Der. (mg/kg-day)	Excess Lifetime Cancer Risk - Ingestion	Excess Lifetime Cancer Risk - Dermal Contact	Total Excess Lifetime Cancer Risk
Arsenic	1.00E+00	0.3	0.001	1.50E+00	3.98E-08	3.98E-08	1.77E-10	1.77E-10	5.98E-08	2.66E-10	6.00E-08
Benzo(a)anthracene	1.00E+00	0.29	0.02	7.30E-01	3.85E-08	3.85E-08	3.55E-09	3.55E-09	2.81E-08	2.59E-09	3.07E-08
Benzo(a)pyrene	1.00E+00	0.29	0.02	7.30E+00	3.85E-08	3.85E-08	3.55E-09	3.55E-09	2.81E-07	2.59E-08	3.07E-07
Benzo(b)fluoranthene	1.00E+00	0.29	0.02	7.30E-01	3.85E-08	3.85E-08	3.55E-09	3.55E-09	2.81E-08	2.59E-09	3.07E-08
Copper	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Dibenzo(a,h)anthracene	1.00E+00	0.29	0.02	7.30E+00	3.85E-08	3.85E-08	3.55E-09	3.55E-09	2.81E-07	2.59E-08	3.07E-07
Dieldrin	1.00E+00	1	0.01	1.60E+01	1.33E-07	1.33E-07	1.77E-09	1.77E-09	2.12E-06	2.84E-08	2.15E-06
Indeno(1,2,3-cd)pyrene	1.00E+00	0.29	0.02	7.30E-01	3.85E-08	3.85E-08	3.55E-09	3.55E-09	2.81E-08	2.59E-09	3.07E-08
Total 2,3,7,8-TCDD TEQ	1.00E+00	0.5	0.05	1.50E+05	6.64E-08	6.64E-08	8.87E-09	8.87E-09	9.96E-03	1.33E-03	1.13E-02
Total PCBs	1.00E+00	0.83	0.04	2.00E+00	1.10E-07	1.10E-07	7.09E-09	7.09E-09	2.20E-07	1.42E-08	2.35E-07

TABLE
POTENTIAL CARCINOGENIC RISK - RME
INCIDENTIAL INGESTION AND DERMAL CONTACT
SURFACE SOIL
OUTDOOR WORKER RME
SAUGET AREA 1 - EE/CA AND RI/FS

	Reference	Transect 3		Transect 4		Transect 6		Transect 7		Fill Area H		Fill Area I		Fill Area L	
Constituent	Risk (per mg/kg)	EPC (mg/kg)	Risk	EPC (mg/kg)	Risk	EPC (mg/kg)	Risk	EPC (mg/kg)	Risk	EPC (mg/kg)	Risk	EPC (mg/kg)	Risk	EPC (mg/kg)	Risk
Arsenic	6.00E-08	--	NC	--	NC	--	NC	1.50E+01	8.99E-07	6.40E+01	3.84E-06	--	NC	3.70E+01	2.22E-06
Benzo(a)anthracene	3.07E-08	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Benzo(a)pyrene	3.07E-07	2.60E-01	7.98E-08	3.50E+00	1.07E-06	3.60E+00	1.11E-06	2.10E+00	6.45E-07	--	NC	2.20E+00	6.75E-07	7.00E+00	2.15E-06
Benzo(b)fluoranthene	3.07E-08	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Copper	NC	--	NC	--	NC	--	NC	--	NC	--	NC	1.30E+04	NC	--	NC
Dibenzo(a,h)anthracene	3.07E-07	--	NC	2.30E-01	7.06E-08	--	NC	--	NC	--	NC	--	NC	1.30E+00	3.99E-07
Dieldrin	2.15E-06	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Indeno(1,2,3-cd)pyrene	3.07E-08	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Total 2,3,7,8-TCDD TEQ	1.13E-02	--	NC	--	NC	--	NC	--	NC	1.30E-03	1.47E-05	1.20E-02	1.35E-04	--	NC
Total PCBs	2.35E-07	--	NC	--	NC	--	NC	--	NC	1.52E+00	3.57E-07	1.21E+02	2.85E-05	1.07E+00	2.51E-07
	Total:		7.98E-08		1.15E-06		1.11E-06		1.54E-06		1.89E-05		1.65E-04		5.02E-06

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.

SAUGET AREA 1 - EE/CA AND RI/FS
RME
NONCARCINOGENIC HAZARD INDEX
INCIDENTIAL INGESTION AND DERMAL CONTACT
SURFACE SOIL
OUTDOOR WORKER RME

Constituent	Unit Concentration in Soil (mg/kg-soil)	Oral - Soil Absorption Adjustment Factor	Dermal - Soil Absorption Adjustment Factor	Oral Reference Dose (mg/kg-day)	ADDIng RME Outdoor Worker (mg/kg-day)	Chronic Average Daily Dose-Ing. (mg/kg-day)	ADDder RME Outdoor Worker (mg/kg-day)	Chronic Average Daily Dose-Der. (mg/kg-day)	Hazard Index - Ingestion	Hazard Index - Dermal Contact	Total Hazard Index
Arsenic	1.00E+00	0.3	0.001	3.00E-04	1.12E-07	1.12E-07	4.97E-10	4.97E-10	3.72E-04	1.66E-06	3.73E-04
Benzo(a)anthracene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Benzo(a)pyrene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Benzo(b)fluoranthene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Copper	1.00E+00	1	0.002	3.70E-02	3.72E-07	3.72E-07	9.93E-10	9.93E-10	1.00E-05	2.68E-08	1.01E-05
Dibenzo(a,h)anthracene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Dieldrin	1.00E+00	1	0.01	5.00E-05	3.72E-07	3.72E-07	4.97E-09	4.97E-09	7.44E-03	9.93E-05	7.54E-03
Indeno(1,2,3-cd)pyrene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Total 2,3,7,8-TCDD TEQ	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Total PCBs	1.00E+00	0.83	0.04	2.00E-05	3.09E-07	3.09E-07	1.99E-08	1.99E-08	1.54E-02	9.93E-04	1.64E-02

TABLE
POTENTIAL HAZARD INDEX - RME
INCIDENTIAL INGESTION AND DERMAL CONTACT
SURFACE SOIL
OUTDOOR WORKER RME
SAUGET AREA 1 - EE/CA AND RI/FS

	Reference	Transect 3		Transect 4		Transect 6		Transect 7		Fill Area H		Fill Area I		Fill Area L	
Constituent	HQ (per mg/kg)	EPC (mg/kg)	HQ	EPC (mg/kg)	HQ	EPC (mg/kg)	HQ	EPC (mg/kg)	HQ	EPC (mg/kg)	HQ	EPC (mg/kg)	HQ	EPC (mg/kg)	HQ
Arsenic	3.73E-04	--	NC	--	NC	--	NC	1.50E+01	5.59E-03	6.40E+01	2.39E-02	--	NC	3.70E+01	1.38E-02
Benzo(a)anthracene	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Benzo(a)pyrene	NC	2.60E-01	NC	3.50E+00	NC	3.60E+00	NC	2.10E+00	NC	--	NC	2.20E+00	NC	7.00E+00	NC
Benzo(b)fluoranthene	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Copper	1.01E-05	--	NC	--	NC	--	NC	--	NC	--	NC	1.30E+04	1.31E-01	--	NC
Dibenzo(a,h)anthracene	NC	--	NC	2.30E-01	NC	--	NC	--	NC	--	NC	--	NC	1.30E+00	NC
Dieldrin	7.54E-03	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Indeno(1,2,3-cd)pyrene	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Total 2,3,7,8-TCDD TEQ	NC	--	NC	--	NC	--	NC	--	NC	1.30E-03	NC	1.20E-02	NC	--	NC
Total PCBs	1.64E-02	--	NC	--	NC	--	NC	--	NC	1.52E+00	2.50E-02	1.21E+02	1.99E+00	1.07E+00	1.76E-02
	Total HI:		NC		NC		NC		5.59E-03		4.89E-02		2.12E+00		3.14E-02

Notes:
-- Not a constituent of concern in this area/medium.
-- Not a constituent of concern in this area/medium.
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.

SAUGET AREA 1 - EE/CA AND RI/FS
RME

Receptors Evaluated:	
Receptor 1:	RME Outdoor Worker

ASSUMPTIONS FOR OUTDOOR WORKER - RME INHALATION OF OUTDOOR AIR PARTICULATES		Assumed Value	Units	Calculated Value
Inhalation Rate	RME Outdoor Worker	1.6	(m^3 air/hour)	
Body Weight	RME Outdoor Worker	70	(kg)	
Exposure Time	RME Outdoor Worker	8	(hrs/day) =	8.00E+00
Exposure Frequency	RME Outdoor Worker	190	(days)/365 (days) =	5.21E-01
Exposure Duration (cancer)	RME Outdoor Worker	25	(yrs)/70(yrs) =	3.57E-01
Exposure Duration (noncancer)	RME Outdoor Worker	25	(yrs)/25(yrs) =	1.00E+00
Lifetime		70	(years)	

SAUGET AREA 1 - EE/CA AND RI/FS
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR PARTICULATES
OUTDOOR WORKER - RME

Constituent	Unit Concentration In Air (mg/m³ air)	Inhalation Absorption Adjustment Factor	Inhalation Cancer Slope Factor (mg/kg-day)⁻¹	ADDInh RME Outdoor Worker (mg/kg-day)	Lifetime Average Daily Dose - Inh. (mg/kg-day)	Excess Lifetime Cancer Risk - Inhalation
Arsenic	1.00E+00	1	1.50E+01	3.40E-02	3.40E-02	5.10E-01
Benzo(a)anthracene	1.00E+00	1	3.10E-01	3.40E-02	3.40E-02	1.05E-02
Benzo(a)pyrene	1.00E+00	1	3.10E+00	3.40E-02	3.40E-02	1.05E-01
Benzo(b)fluoranthene	1.00E+00	1	3.10E-01	3.40E-02	3.40E-02	1.05E-02
Copper	1.00E+00	NA	NA	NA	NA	NC
Dibenzo(a,h)anthracene	1.00E+00	1	3.10E+00	3.40E-02	3.40E-02	1.05E-01
Dieldrin	1.00E+00	1	1.61E+01	3.40E-02	3.40E-02	5.47E-01
Indeno(1,2,3-cd)pyrene	1.00E+00	1	3.10E-01	3.40E-02	3.40E-02	1.05E-02
Total 2,3,7,8-TCDD TEQ	1.00E+00	1	1.50E+05	3.40E-02	3.40E-02	5.10E+03
Total PCBs	1.00E+00	1	2.00E+00	3.40E-02	3.40E-02	6.80E-02

TABLE
POTENTIAL CARCINOGENIC RISK
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR PARTICULATES
OUTDOOR WORKER - RME

	Reference	Transect 3		Transect 4		Transect 6		Transect 7		Fill Area H		Fill Area I		Fill Area L	
Constituent	Risk (per mg/m3)	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk
Arsenic	5.10E-01	--	NC	--	NC	--	NC	1.27E-08	6.45E-09	8.11E-08	4.13E-08	--	NC	3.13E-08	1.59E-08
Benzo(a)anthracene	1.05E-02	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Benzo(a)pyrene	1.05E-01	2.20E-10	2.32E-11	2.96E-09	3.12E-10	3.04E-09	3.21E-10	1.77E-09	1.87E-10	--	NC	3.64E-09	3.84E-10	5.91E-09	6.23E-10
Benzo(b)fluoranthene	1.05E-02	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Copper	NC	--	NC	--	NC	--	NC	--	NC	--	NC	2.15E-05	NC	--	NC
Dibenzo(a,h)anthracene	1.05E-01	--	NC	1.94E-10	2.05E-11	--	NC	--	NC	--	NC	--	NC	1.10E-09	1.16E-10
Dieldrin	5.47E-01	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Indeno(1,2,3-cd)pyrene	1.05E-02	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Total 2,3,7,8-TCDD TEQ	5.10E+03	--	NC	--	NC	--	NC	--	NC	1.65E-12	8.40E-09	1.99E-11	1.01E-07	--	NC
Total PCBs	6.80E-02	--	NC	--	NC	--	NC	--	NC	1.93E-09	1.31E-10	2.01E-07	1.37E-08	9.04E-10	6.15E-11
	Total:		2.32E-11		3.32E-10		3.21E-10		6.64E-09		4.99E-08		1.15E-07		1.67E-08

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
NC - Not Calculated.

SAUGET AREA 1 - EE/CA AND RI/FS
NONCARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR PARTICULATES
OUTDOOR WORKER - RME

Constituent	Unit Concentration In Air (mg/m³ air)	Inhalation Absorption Adjustment Factor	Inhalation Reference Dose E (mg/kg-day)	ADDinh Outdoor Worker (mg/kg-day)	Chronic Average Daily Dose-Inh (mg/kg-day)	Hazard Index - Inhalation
Arsenic	1.00E+00	NA	NA	NA	NA	NC
Benzo(a)anthracene	1.00E+00	NA	NA	NA	NA	NC
Benzo(a)pyrene	1.00E+00	NA	NA	NA	NA	NC
Benzo(b)fluoranthene	1.00E+00	NA	NA	NA	NA	NC
Copper	1.00E+00	NA	NA	NA	NA	NC
Dibenzo(a,h)anthracene	1.00E+00	NA	NA	NA	NA	NC
Dieldrin	1.00E+00	NA	NA	NA	NA	NC
Indeno(1,2,3-cd)pyrene	1.00E+00	NA	NA	NA	NA	NC
Total 2,3,7,8-TCDD TEQ	1.00E+00	NA	NA	NA	NA	NC
Total PCBs	1.00E+00	NA	NA	NA	NA	NC

P–22

SAUGET AREA 1 - EE/CA AND RI/FS
RME

Receptors Evaluated:	
Receptor 1:	RME Outdoor Industrial Worker

ASSUMPTIONS FOR INHALATION OF	OUTDOOR WORKER - RME OUTDOOR AIR VOCs	Assumed Value	Units	Calculated Value
Inhalation Rate	RME Outdoor Industrial Worker	1.6	(m^3 air/hour)	
Body Weight	RME Outdoor Industrial Worker	70	(kg)	
Exposure Time	RME Outdoor Industrial Worker	8	(hrs/day) =	8.00E+00
Exposure Frequency	RME Outdoor Industrial Worker	190	(days)/365 (days) =	5.21E-01
Exposure Duration (cancer)	RME Outdoor Industrial Worker	25	(yrs)/70(yrs) =	3.57E-01
Exposure Duration (noncancer)	RME Outdoor Industrial Worker	25	(yrs)/25(yrs) =	1.00E+00
Lifetime		70	(years)	

SAUGET AREA 1 - EE/CA AND RI/FS
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR VOCs
OUTDOOR WORKER - RME

Constituent	Unit Concentration In Air (mg/m³ air)	Inhalation Absorption Adjustment Factor	Inhalation Cancer Slope Factor (mg/kg-day)⁻¹	ADDinh RME Outdoor Industrial Worker (mg/kg-day)	Lifetime Average Daily Dose - Inh. (mg/kg-day)	Excess Lifetime Cancer Risk - Inhalation
1,1,2,2-Tetrachloroethane	1.00E+00	1	2.03E-01	3.40E-02	3.40E-02	6.90E-03
4-Methyl-2-pentanone	1.00E+00	NA	NA	NA	NA	NC
Benzene	1.00E+00	1	7.70E-03	3.40E-02	3.40E-02	2.62E-04
Chlorobenzene	1.00E+00	NA	NA	NA	NA	NC
Chloroform	*1.00E+00*	*0.66*	*8.05E-02*	*2.24E-02*	*2.24E-02*	*1.81E-03*
Ethylbenzene	1.00E+00	NA	NA	NA	NA	NC
Naphthalene	1.00E+00	NA	NA	NA	NA	NC
Tetrachloroethene	1.00E+00	1	2.00E-03	3.40E-02	3.40E-02	6.80E-05
Toluene	1.00E+00	NA	NA	NA	NA	NC
Trichloroethene	1.00E+00	1	6.00E-03	3.40E-02	3.40E-02	2.04E-04
Vinyl chloride	1.00E+00	1	1.54E-02	3.40E-02	3.40E-02	5.24E-04

TABLE
POTENTIAL CARCINOGENIC RISK
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR VOCs
OUTDOOR WORKER - RME

Constituent	Reference Risk (per mg/m3)	Fill Area G (a)		Fill Area H (a)		Fill Area I (a)		Fill Area L (a)	
		EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk
1,1,2,2-Tetrachloroethan	6.90E-03	--	NC	2.50E-07	1.73E-09	--	NC	--	NC
4-Methyl-2-pentanone	NC	9.50E-06	NC	--	NC	--	NC	--	NC
Benzene	2.62E-04	1.40E-04	3.66E-08	1.40E-04	3.66E-08	1.20E-04	3.14E-08	1.00E-06	2.62E-10
Chlorobenzene	NC	9.50E-05	NC	1.60E-04	NC	6.10E-04	NC	--	NC
Chloroform	1.81E-03	--	NC	2.50E-05	4.52E-08	--	NC	1.40E-06	2.53E-09
Ethylbenzene	NC	--	NC	1.20E-04	NC	--	NC	--	NC
Naphthalene	NC	6.90E-06	NC	1.30E-05	NC	--	NC	--	NC
Tetrachloroethene	6.80E-05	1.50E-05	1.02E-09	--	NC	--	NC	--	NC
Toluene	NC	3.40E-04	NC	--	NC	--	NC	--	NC
Trichloroethene	2.04E-04	1.70E-05	3.47E-09	7.00E-06	1.43E-09	6.40E-05	1.31E-08	--	NC
Vinyl chloride	5.24E-04	2.30E-05	1.20E-08	--	NC	2.30E-03	1.20E-06	--	NC
	Total:		5.32E-08		8.50E-08		1.25E-06		2.79E-09

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
(a) - Maximum outdoor air EPC from this area.

SAUGET AREA 1 - EE/CA AND RI/FS
NONCARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR VOCs
OUTDOOR WORKER - RME

Constituent	Unit Concentration In Air (mg/m^3 air)	Inhalation Absorption Adjustment Factor	Inhalation Reference Dose (mg/kg-day)	ADDInh Industrial Worker (mg/kg-day)	Chronic Average Daily Dose-Inh (mg/kg-day)	Hazard Index - Inhalation
1,1,2,2-Tetrachloroethane	1.00E+00	NA	NA	NA	NA	NC
4-Methyl-2-pentanone	1.00E+00	1	2.29E-02	9.52E-02	9.52E-02	4.16E+00
Benzene	1.00E+00	1	1.70E-03	9.52E-02	9.52E-02	5.60E+01
Chlorobenzene	1.00E+00	1	5.71E-03	9.52E-02	9.52E-02	1.67E+01
Chloroform	1.00E+00	1	8.60E-05	9.52E-02	9.52E-02	1.11E+03
Ethylbenzene	1.00E+00	1	2.86E-01	9.52E-02	9.52E-02	3.33E-01
Naphthalene	1.00E+00	1	8.57E-04	9.52E-02	9.52E-02	1.11E+02
Tetrachloroethene	1.00E+00	1	1.14E-01	9.52E-02	9.52E-02	8.35E-01
Toluene	1.00E+00	1	1.14E-01	9.52E-02	9.52E-02	8.35E-01
Trichloroethene	1.00E+00	NA	NA	NA	NA	NC
Vinyl chloride	1.00E+00	1	2.86E-02	9.52E-02	9.52E-02	3.33E+00

TABLE
POTENTIAL HAZARD INDEX
NONCARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR VOCs
OUTDOOR WORKER - RME

Constituent	Reference HQ (per mg/m3)	Fill Area G (a)		Fill Area H (a)		Fill Area I (a)		Fill Area L (a)	
		EPC (mg/m3)	HQ	EPC (mg/m3)	HQ	EPC (mg/m3)	HQ	EPC (mg/m3)	HQ
1,1,2,2-Tetrachloroethane	NC	--	NC	2.50E-07	NC	--	NC	--	NC
4-Methyl-2-pentanone	4.16E+00	9.50E-06	3.96E-05	--	NC	--	NC	--	NC
Benzene	5.60E+01	1.40E-04	7.84E-03	1.40E-04	7.84E-03	1.20E-04	6.72E-03	1.00E-06	5.60E-05
Chlorobenzene	1.67E+01	9.50E-05	1.58E-03	1.60E-04	2.67E-03	8.10E-04	1.35E-02	--	NC
Chloroform	1.11E+03	--	NC	2.50E-05	2.77E-02	--	NC	1.40E-06	1.55E-03
Ethylbenzene	3.33E-01	--	NC	1.20E-04	3.99E-05	--	NC	--	NC
Naphthalene	1.11E+02	6.90E-06	7.66E-04	1.30E-05	1.44E-03	--	NC	--	NC
Tetrachloroethene	8.35E-01	1.50E-05	1.25E-05	--	NC	--	NC	--	NC
Toluene	8.35E-01	3.40E-04	2.84E-04	--	NC	--	NC	--	NC
Trichloroethene	NC	1.70E-05	NC	7.00E-06	NC	6.40E-05	NC	--	NC
Vinyl chloride	3.33E+00	2.30E-05	7.66E-05	--	NC	2.30E-03	7.66E-03	--	NC
	Total HI:		**1.06E-02**		**3.97E-02**		**2.79E-02**		**1.61E-03**

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
(a) - Maximum outdoor air EPC from this area.

P-27

SAUGET AREA 1 - EE/CA AND RI/FS
MLE

Receptors Evaluated	
Receptor 3:	MLE Outdoor Worker

ASSUMPTIONS FOR OUTDOOR WORKER MLE INCIDENTIAL INGESTION AND DERMAL CONTACT SURFACE SOIL		Assumed Value	Units	Calculated Value
Soil Ingestion Rate	MLE Outdoor Worker	30	(mg soil/day)	
Soil on Skin	MLE Outdoor Worker	0.02	(mg/cm^2)	
Skin Exposed	MLE Outdoor Worker	3339	(cm^2)	
Body Weight	MLE Outdoor Worker	70	(kg)	
Exposure Frequency	MLE Outdoor Worker	190	(days)/365(days) =	5.21E-01
Exposure Duration (cancer)	MLE Outdoor Worker	7	(years)/70(years) =	1.00E-01
Exposure Duration (noncancer)	MLE Outdoor Worker	7	(yrs)/7(yrs) =	1.00E+00
Lifetime		70	(years)	
Unit Conversion Factor		1.00E-06	(kg/mg)	

22-Dec-00

P-28

SAUGET AREA 1 - EE/CA AND RI/FS
MLE
POTENTIAL CARCINOGENIC RISK
INCIDENTIAL INGESTION AND DERMAL CONTACT
SURFACE SOIL
OUTDOOR WORKER MLE

Constituent	Unit Concentration in Soil (mg/kg soil)	Oral - Soil Absorption Adjustment Factor	Dermal - Soil Absorption Adjustment Factor	Oral Cancer Slope Factor (mg/kg-day)⁻¹	ADDing MLE Outdoor Worker (mg/kg-day)	Lifetime Average Daily Dose-Ing. (mg/kg-day)	ADDder MLE Outdoor Worker (mg/kg-day)	Lifetime Average Daily Dose-Der. (mg/kg-day)	Excess Lifetime Cancer Risk - Ingestion	Excess Lifetime Cancer Risk - Dermal Contact	Total Excess Lifetime Cancer Risk
Arsenic	1.00E+00	0.3	0.001	1.50E+00	6.69E-09	6.69E-09	4.97E-11	4.97E-11	1.00E-08	7.45E-11	1.01E-08
Benzo(a)anthracene	1.00E+00	0.29	0.02	7.30E-01	6.47E-09	6.47E-09	9.93E-10	9.93E-10	4.72E-09	7.25E-10	5.45E-09
Benzo(a)pyrene	1.00E+00	0.29	0.02	7.30E+00	6.47E-09	6.47E-09	9.93E-10	9.93E-10	4.72E-08	7.25E-09	5.45E-08
Benzo(b)fluoranthene	1.00E+00	0.29	0.02	7.30E-01	6.47E-09	6.47E-09	9.93E-10	9.93E-10	4.72E-09	7.25E-10	5.45E-09
Copper	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Dibenzo(a,h)anthracene	1.00E+00	0.29	0.02	7.30E+00	6.47E-09	6.47E-09	9.93E-10	9.93E-10	4.72E-08	7.25E-09	5.45E-08
Dieldrin	1.00E+00	1	0.01	1.60E+01	2.23E-08	2.23E-08	4.97E-10	4.97E-10	3.57E-07	7.95E-09	3.65E-07
Indeno(1,2,3-cd)pyrene	1.00E+00	0.29	0.02	7.30E-01	6.47E-09	6.47E-09	9.93E-10	9.93E-10	4.72E-09	7.25E-10	5.45E-09
Total 2,3,7,8-TCDD TEQ	1.00E+00	0.5	0.05	1.50E+05	1.12E-08	1.12E-08	2.48E-09	2.48E-09	1.67E-03	3.72E-04	2.05E-03
Total PCBs	1.00E+00	0.83	0.04	2.00E+00	1.85E-08	1.85E-08	1.99E-09	1.99E-09	3.70E-08	3.97E-09	4.10E-08

TABLE
POTENTIAL CARCINOGENIC RISK - MLE
INCIDENTIAL INGESTION AND DERMAL CONTACT
SURFACE SOIL
OUTDOOR WORKER MLE
SAUGET AREA 1 - EE/CA AND RI/FS

Constituent	Reference Risk (per mg/kg)	Transect 3		Transect 4		Transect 6		Transect 7		Fill Area H		Fill Area I		Fill Area L	
		EPC (mg/kg)	Risk	EPC (mg/kg)	Risk	EPC (mg/kg)	Risk	EPC (mg/kg)	Risk	EPC (mg/kg)	Risk	EPC (mg/kg)	Risk	EPC (mg/kg)	Risk
Arsenic	1.01E-08	--	NC	--	NC	--	NC	9.99E+00	1.01E-07	2.28E+01	2.31E-07	--	NC	3.33E+01	3.37E-07
Benzo(a)anthracene	5.45E-09	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Benzo(a)pyrene	5.45E-08	1.37E-01	7.46E-09	5.90E-01	3.21E-08	5.04E-01	2.75E-08	3.74E-01	2.04E-08	--	NC	6.29E-01	3.43E-08	2.30E+00	1.25E-07
Benzo(b)fluoranthene	5.45E-09	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Copper	NC	--	NC	--	NC	--	NC	--	NC	--	NC	6.66E+03	NC	--	NC
Dibenzo(a,h)anthracene	5.45E-08	--	NC	1.30E-01	7.08E-09	--	NC	--	NC	--	NC	--	NC	4.55E-01	2.48E-08
Dieldrin	3.65E-07	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Indeno(1,2,3-cd)pyrene	5.45E-09	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Total 2,3,7,8-TCDD TEQ	2.05E-03	--	NC	--	NC	--	NC	--	NC	5.33E-04	1.09E-06	3.34E-03	6.83E-06	--	NC
Total PCBs	4.10E-08	--	NC	--	NC	--	NC	--	NC	6.60E-01	2.71E-08	3.13E+01	1.28E-06	4.90E-01	2.01E-08
	Total:		7.46E-09		3.92E-08		2.75E-08		1.21E-07		1.35E-06		8.15E-06		5.07E-07

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.

P-30

SAUGET AREA 1 - EE/CA AND RI/FS
MLE
NONCARCINOGENIC HAZARD INDEX
INCIDENTIAL INGESTION AND DERMAL CONTACT
SURFACE SOIL
OUTDOOR WORKER MLE

Constituent	Unit Concentration in Soil (mg/kg-soil)	Oral - Soil Absorption Adjustment Factor	Dermal - Soil Absorption Adjustment Factor	Oral Reference Dose (mg/kg-day)	ADDIng MLE Outdoor Worker (mg/kg-day)	Chronic Average Daily Dose-Ing. (mg/kg-day)	ADDder MLE Outdoor Worker (mg/kg-day)	Chronic Average Daily Dose-Der. (mg/kg-day)	Hazard Index - Ingestion	Hazard Index - Dermal Contact	Total Hazard Index
Arsenic	1.00E+00	0.3	0.001	3.00E-04	6.69E-08	6.69E-08	4.97E-10	4.97E-10	2.23E-04	1.66E-06	2.25E-04
Benzo(a)anthracene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Benzo(a)pyrene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Benzo(b)fluoranthene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Copper	1.00E+00	1	0.002	3.70E-02	2.23E-07	2.23E-07	9.93E-10	9.93E-10	6.03E-06	2.68E-08	6.06E-06
Dibenzo(a,h)anthracene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Dieldrin	1.00E+00	1	0.01	5.00E-05	2.23E-07	2.23E-07	4.97E-09	4.97E-09	4.46E-03	9.93E-05	4.56E-03
Indeno(1,2,3-cd)pyrene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Total 2,3,7,8-TCDD TEQ	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Total PCBs	1.00E+00	0.83	0.04	2.00E-05	1.85E-07	1.85E-07	1.99E-08	1.99E-08	9.26E-03	9.93E-04	1.03E-02

P-31

TABLE
POTENTIAL HAZARD INDEX - MLE
INCIDENTIAL INGESTION AND DERMAL CONTACT
SURFACE SOIL
OUTDOOR WORKER MLE
SAUGET AREA 1 - EE/CA AND RI/FS

	Reference	Transect 3		Transect 4		Transect 6		Transect 7		Fill Area H		Fill Area I		Fill Area L	
Constituent	HQ (per mg/kg)	EPC (mg/kg)	HQ	EPC (mg/kg)	HQ	EPC (mg/kg)	HQ	EPC (mg/kg)	HQ	EPC (mg/kg)	HQ	EPC (mg/kg)	HQ	EPC (mg/kg)	HQ
Arsenic	2.25E-04	--	NC	--	NC	--	NC	9.99E+00	2.25E-03	2.28E+01	5.12E-03	--	NC	3.33E+01	7.48E-03
Benzo(a)anthracene	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Benzo(a)pyrene	NC	1.37E-01	NC	5.90E-01	NC	5.04E-01	NC	3.74E-01	NC	--	NC	6.29E-01	NC	2.30E+00	NC
Benzo(b)fluoranthene	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Copper	6.06E-06	--	NC	--	NC	--	NC	--	NC	--	NC	6.66E+03	4.03E-02	--	NC
Dibenzo(a,h)anthracene	NC	--	NC	1.30E-01	NC	--	NC	--	NC	--	NC	--	NC	4.55E-01	NC
Dieldrin	4.56E-03	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Indeno(1,2,3-cd)pyrene	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Total 2,3,7,8-TCDD TEQ	NC	--	NC	--	NC	--	NC	--	NC	5.33E-04	NC	3.34E-03	NC	--	NC
Total PCBs	1.03E-02	--	NC	--	NC	--	NC	--	NC	6.60E-01	6.77E-03	3.13E+01	3.21E-01	4.90E-01	5.02E-03
	Total HI:		NC		NC		NC		2.25E-03		1.19E-02		3.61E-01		1.25E-02

Notes:
-- Not a constituent of concern in this area/medium.
-- Not a constituent of concern in this area/medium.
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.

SAUGET AREA 1 - EE/CA AND RI/FS
MLE

Receptors Evaluated:	
Receptor 1:	MLE Outdoor Worker

ASSUMPTIONS FOR OUTDOOR WORKER - MLE INHALATION OF OUTDOOR AIR PARTICULATES		**Assumed Value**	**Units**	**Calculated Value**
Inhalation Rate	MLE Outdoor Worker	1	(m^3 air/hour)	
Body Weight	MLE Outdoor Worker	70	(kg)	
Exposure Time	MLE Outdoor Worker	8	(hrs/day) =	8.00E+00
Exposure Frequency	MLE Outdoor Worker	190	(days)/365 (days) =	5.21E-01
Exposure Duration (cancer)	MLE Outdoor Worker	7	(yrs)/70(yrs) =	1.00E-01
Exposure Duration (noncancer)	MLE Outdoor Worker	7	(yrs)/7(yrs) =	1.00E+00
Lifetime		70	(years)	

P-33

SAUGET AREA 1 - EE/CA AND RI/FS
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR PARTICULATES
OUTDOOR WORKER - MLE

Constituent	Unit Concentration In Air (mg/m³ air)	Inhalation Absorption Adjustment Factor	Inhalation Cancer Slope Factor (mg/kg-day)⁻¹	ADDInh MLE Outdoor Worker (mg/kg-day)	Lifetime Average Daily Dose - Inh. (mg/kg-day)	Excess Lifetime Cancer Risk - Inhalation
Arsenic	1.00E+00	1	1.50E+01	5.95E-03	5.95E-03	8.92E-02
Benzo(a)anthracene	1.00E+00	1	3.10E-01	5.95E-03	5.95E-03	1.84E-03
Benzo(a)pyrene	1.00E+00	1	3.10E+00	5.95E-03	5.95E-03	1.84E-02
Benzo(b)fluoranthene	1.00E+00	1	3.10E-01	5.95E-03	5.95E-03	1.84E-03
Copper	1.00E+00	NA	NA	NA	NA	NC
Dibenzo(a,h)anthracene	1.00E+00	1	3.10E+00	5.95E-03	5.95E-03	1.84E-02
Dieldrin	1.00E+00	1	1.61E+01	5.95E-03	5.95E-03	9.58E-02
Indeno(1,2,3-cd)pyrene	1.00E+00	1	3.10E-01	5.95E-03	5.95E-03	1.84E-03
Total 2,3,7,8-TCDD TEQ	1.00E+00	1	1.50E+05	5.95E-03	5.95E-03	8.92E+02
Total PCBs	1.00E+00	1	2.00E+00	5.95E-03	5.95E-03	1.19E-02

P-34

TABLE
POTENTIAL CARCINOGENIC RISK
CARCINOGENIC ASSESSMENT
INHALATION OF:
OUTDOOR AIR PARTICULATES
OUTDOOR WORKER - MLE

Constituent	Reference Risk (per mg/m3)	Transect 3		Transect 4		Transect 6		Transect 7		Fill Area H		Fill Area I		Fill Area L	
		EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk
Arsenic	8.92E-02	--	NC	--	NC	--	NC	8.44E-09	7.53E-10	2.89E-08	2.58E-09	--	NC	2.81E-08	2.51E-09
Benzo(a)anthracene	1.84E-03	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Benzo(a)pyrene	1.84E-02	1.16E-10	2.13E-12	4.99E-10	9.19E-12	4.26E-10	7.85E-12	3.16E-10	5.83E-12	--	NC	1.04E-09	1.92E-11	1.94E-09	3.58E-11
Benzo(b)fluoranthene	1.84E-03	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Copper	NC	--	NC	--	NC	--	NC	--	NC	--	NC	1.10E-05	NC	--	NC
Dibenzo(a,h)anthracene	1.84E-02	--	NC	1.10E-10	2.03E-12	--	NC	--	NC	--	NC	--	NC	3.84E-10	7.09E-12
Dieldrin	9.58E-02	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Indeno(1,2,3-cd)pyrene	1.84E-03	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Total 2,3,7,8-TCDD TEQ	8.92E+02	--	NC	--	NC	--	NC	--	NC	6.75E-13	6.02E-10	5.53E-12	4.94E-09	--	NC
Total PCBs	1.19E-02	--	NC	--	NC	--	NC	--	NC	8.36E-10	9.95E-12	5.18E-08	6.17E-10	4.14E-10	4.93E-12
Total:			**2.13E-12**		**1.12E-11**		**7.85E-12**		**7.59E-10**		**3.19E-09**		**5.57E-09**		**2.56E-09**

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
NC - Not Calculated.

P-35

SAUGET AREA 1 - EE/CA AND RI/FS
NONCARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR PARTICULATES
OUTDOOR WORKER - MLE

Constituent	Unit Concentration In Air (mg/m³ air)	Inhalation Absorption Adjustment Factor	Inhalation Reference Dose E (mg/kg-day)	ADDinh Outdoor Worker (mg/kg-day)	Chronic Average Daily Dose-inh (mg/kg-day)	Hazard Index - Inhalation
Arsenic	1.00E+00	NA	NA	NA	NA	NC
Benzo(a)anthracene	1.00E+00	NA	NA	NA	NA	NC
Benzo(a)pyrene	1.00E+00	NA	NA	NA	NA	NC
Benzo(b)fluoranthene	1.00E+00	NA	NA	NA	NA	NC
Copper	1.00E+00	NA	NA	NA	NA	NC
Dibenzo(a,h)anthracene	1.00E+00	NA	NA	NA	NA	NC
Dieldrin	1.00E+00	NA	NA	NA	NA	NC
Indeno(1,2,3-cd)pyrene	1.00E+00	NA	NA	NA	NA	NC
Total 2,3,7,8-TCDD TEQ	1.00E+00	NA	NA	NA	NA	NC
Total PCBs	1.00E+00	NA	NA	NA	NA	NC

SAUGET AREA 1 - EE/CA AND RI/FS
MLE

Receptors Evaluated:	
Receptor 1:	MLE Outdoor Industrial Worker

ASSUMPTIONS FOR INHALATION OF	OUTDOOR WORKER - MLE OUTDOOR AIR VOCs	Assumed Value	Units	Calculated Value
Inhalation Rate	MLE Outdoor Industrial Worker	1.0	(m^3 air/hour)	
Body Weight	MLE Outdoor Industrial Worker	70	(kg)	
Exposure Time	MLE Outdoor Industrial Worker	8	(hrs/day) =	8.00E+00
Exposure Frequency	MLE Outdoor Industrial Worker	190	(days)/365 (days) =	5.21E-01
Exposure Duration (cancer)	MLE Outdoor Industrial Worker	7	(yrs)/70(yrs) =	1.00E-01
Exposure Duration (noncancer)	MLE Outdoor Industrial Worker	7	(yrs)/7(yrs) =	1.00E+00
Lifetime		70	(years)	

P-37

SAUGET AREA 1 - EE/CA AND RI/FS
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR VOCs
OUTDOOR WORKER - MLE

Constituent	Unit Concentration In Air (mg/m^3 air)	Inhalation Absorption Adjustment Factor	Inhalation Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	ADDInh MLE Outdoor Industrial Worker (mg/kg-day)	Lifetime Average Daily Dose - Inh. (mg/kg-day)	Excess Lifetime Cancer Risk - Inhalation
1,1,2,2-Tetrachloroethane	1.00E+00	1	2.03E-01	5.95E-03	5.95E-03	1.21E-03
4-Methyl-2-pentanone	1.00E+00	NA	NA	NA	NA	NC
Benzene	1.00E+00	1	7.70E-03	5.95E-03	5.95E-03	4.58E-05
Chlorobenzene	1.00E+00	NA	NA	NA	NA	NC
Chloroform	1.00E+00	0.66	8.05E-02	3.93E-03	3.93E-03	3.16E-04
Ethylbenzene	1.00E+00	NA	NA	NA	NA	NC
Naphthalene	1.00E+00	NA	NA	NA	NA	NC
Tetrachloroethene	1.00E+00	1	2.00E-03	5.95E-03	5.95E-03	1.19E-05
Toluene	1.00E+00	NA	NA	NA	NA	NC
Trichloroethene	1.00E+00	1	6.00E-03	5.95E-03	5.95E-03	3.57E-05
Vinyl chloride	1.00E+00	1	1.54E-02	5.95E-03	5.95E-03	9.16E-05

TABLE
POTENTIAL CARCINOGENIC RISK
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR VOCs
OUTDOOR WORKER - MLE

Constituent	Reference Risk (per mg/m3)	Fill Area G (a) EPC (mg/m3)	Fill Area G (a) Risk	Fill Area H (a) EPC (mg/m3)	Fill Area H (a) Risk	Fill Area I (a) EPC (mg/m3)	Fill Area I (a) Risk	Fill Area L (a) EPC (mg/m3)	Fill Area L (a) Risk
1,1,2,2-Tetrachloroethan	1.21E-03	--	NC	5.50E-08	6.64E-11	--	NC	--	NC
4-Methyl-2-pentanone	NC	9.40E-07	NC	--	NC	--	NC	--	NC
Benzene	4.58E-05	1.20E-05	5.50E-10	2.70E-05	1.24E-09	7.90E-06	3.62E-10	3.00E-07	1.37E-11
Chlorobenzene	NC	9.70E-06	NC	2.40E-05	NC	2.90E-05	NC	--	NC
Chloroform	3.16E-04	--	NC	2.60E-06	8.22E-10	--	NC	4.30E-07	1.36E-10
Ethylbenzene	NC	--	NC	1.70E-05	NC	--	NC	--	NC
Naphthalene	NC	7.00E-07	NC	1.50E-06	NC	--	NC	--	NC
Tetrachloroethene	1.19E-05	1.70E-06	2.02E-11	--	NC	--	NC	--	NC
Toluene	NC	3.20E-05	NC	1.20E-06	NC	--	NC	--	NC
Trichloroethene	3.57E-05	1.60E-06	5.71E-11	--	NC	1.90E-06	6.78E-11	--	NC
Vinyl chloride	9.16E-05	4.60E-06	4.21E-10	--	NC	7.10E-05	6.50E-09	--	NC
Total:			**1.05E-09**		**2.13E-09**		**6.93E-09**		**1.50E-10**

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
(a) - Outdoor air EPC calculated based on average groundwater concentration in this area.

P-39

SAUGET AREA 1 - EE/CA AND RI/FS
NONCARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR VOCs
OUTDOOR WORKER - MLE

Constituent	Unit Concentration In Air (mg/m³ air)	Inhalation Absorption Adjustment Factor	Inhalation Reference Dose (mg/kg-day)	ADDinh Industrial Worker (mg/kg-day)	Chronic Average Daily Dose-Inh (mg/kg-day)	Hazard Index - Inhalation
1,1,2,2-Tetrachloroethane	1.00E+00	NA	NA	NA	NA	NC
4-Methyl-2-pentanone	1.00E+00	1	2.29E-02	5.95E-02	5.95E-02	2.60E+00
Benzene	1.00E+00	1	1.70E-03	5.95E-02	5.95E-02	3.50E+01
Chlorobenzene	1.00E+00	1	5.71E-03	5.95E-02	5.95E-02	1.04E+01
Chloroform	1.00E+00	1	8.60E-05	5.95E-02	5.95E-02	6.92E+02
Ethylbenzene	1.00E+00	1	2.86E-01	5.95E-02	5.95E-02	2.08E-01
Naphthalene	1.00E+00	1	8.57E-04	5.95E-02	5.95E-02	6.94E+01
Tetrachloroethene	1.00E+00	1	1.14E-01	5.95E-02	5.95E-02	5.22E-01
Toluene	1.00E+00	1	1.14E-01	5.95E-02	5.95E-02	5.22E-01
Trichloroethene	1.00E+00	NA	NA	NA	NA	NC
Vinyl chloride	1.00E+00	1	2.86E-02	5.95E-02	5.95E-02	2.08E+00

P-40

TABLE
POTENTIAL HAZARD INDEX
NONCARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR VOCs
OUTDOOR WORKER - MLE

Constituent	Reference HQ (per mg/m3)	Fill Area G (a)		Fill Area H (a)		Fill Area I (a)		Fill Area L (a)	
		EPC (mg/m3)	HQ	EPC (mg/m3)	HQ	EPC (mg/m3)	HQ	EPC (mg/m3)	HQ
1,1,2,2-Tetrachloroethane	NC	--	NC	5.50E-08	NC	--	NC	--	NC
4-Methyl-2-pentanone	2.60E+00	9.40E-07	2.45E-06	--	NC	--	NC	--	NC
Benzene	3.50E+01	1.20E-05	4.20E-04	2.70E-05	9.45E-04	7.90E-06	2.76E-04	3.00E-07	1.05E-05
Chlorobenzene	1.04E+01	9.70E-06	1.01E-04	2.40E-05	2.50E-04	2.90E-05	3.02E-04	--	NC
Chloroform	6.92E+02	--	NC	2.60E-06	1.80E-03	--	NC	4.30E-07	2.97E-04
Ethylbenzene	2.08E-01	--	NC	1.70E-05	3.54E-06	--	NC	--	NC
Naphthalene	6.94E+01	7.00E-07	4.86E-05	1.50E-06	1.04E-04	--	NC	--	NC
Tetrachloroethene	5.22E-01	1.70E-06	8.87E-07	--	NC	--	NC	--	NC
Toluene	5.22E-01	3.20E-05	1.67E-05	1.20E-06	6.26E-07	--	NC	--	NC
Trichloroethene	NC	1.60E-06	NC	--	NC	1.90E-06	NC	--	NC
Vinyl chloride	2.08E+00	4.60E-06	9.58E-06	--	NC	7.10E-05	1.48E-04	--	NC
	Total HI:		5.99E-04		3.10E-03		7.26E-04		3.08E-04

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
(a) - Outdoor air EPC calculated based on average groundwater concentration in this area.

SAUGET AREA 1 - EE/CA AND RI/FS
RME

Receptors Evaluated	
Receptor 3:	RME Construction Worker

ASSUMPTIONS FOR CONSTRUCTION WORKER RME INCIDENTIAL INGESTION AND DERMAL CONTACT SOIL		**Assumed Value**	**Units**	**Calculated Value**
Soil Ingestion Rate	RME Construction Worker	100	(mg soil/day)	
Soil on Skin	RME Construction Worker	0.19	(mg/cm^2)	
Skin Exposed	RME Construction Worker	3339	(cm^2)	
Body Weight	RME Construction Worker	70	(kg)	
Exposure Frequency	RME Construction Worker	40	(days)/365(days) =	1.10E-01
Exposure Duration (cancer)	RME Construction Worker	1	(years)/70(years) =	1.43E-02
Exposure Duration (noncancer)	RME Construction Worker	1	(yrs)/1(yrs) =	1.00E+00
Lifetime		70	(years)	
Unit Conversion Factor		1.00E-06	(kg/mg)	

22-Dec-00

P-42

SAUGET AREA 1 - EE/CA AND RI/FS
RME
POTENTIAL CARCINOGENIC RISK
INCIDENTIAL INGESTION AND DERMAL CONTACT
SOIL
CONSTRUCTION WORKER RME

Constituent	Unit Concentration in Soil (mg/kg soil)	Oral - Soil Absorption Adjustment Factor	Dermal - Soil Absorption Adjustment Factor	Oral Cancer Slope Factor (mg/kg-day)$^{-1}$	ADDing RME Construction Worker (mg/kg-day)	Lifetime Average Daily Dose-Ing. (mg/kg-day)	ADDder RME Construction Worker (mg/kg-day)	Lifetime Average Daily Dose-Der. (mg/kg-day)	Excess Lifetime Cancer Risk - Ingestion	Excess Lifetime Cancer Risk - Dermal Contact	Total Excess Lifetime Cancer Risk
Arsenic	1.00E+00	0.3	0.001	1.50E+00	6.71E-10	6.71E-10	1.42E-11	1.42E-11	1.01E-09	2.13E-11	1.03E-09
Benzo(a)anthracene	1.00E+00	0.29	0.02	7.30E-01	6.49E-10	6.49E-10	2.84E-10	2.84E-10	4.73E-10	2.07E-10	6.81E-10
Benzo(a)pyrene	1.00E+00	0.29	0.02	7.30E+00	6.49E-10	6.49E-10	2.84E-10	2.84E-10	4.73E-09	2.07E-09	6.81E-09
Benzo(b)fluoranthene	1.00E+00	0.29	0.02	7.30E-01	6.49E-10	6.49E-10	2.84E-10	2.84E-10	4.73E-10	2.07E-10	6.81E-10
Copper	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Dibenzo(a,h)anthracene	1.00E+00	0.29	0.02	7.30E+00	6.49E-10	6.49E-10	2.84E-10	2.84E-10	4.73E-09	2.07E-09	6.81E-09
Dieldrin	1.00E+00	1	0.01	1.60E+01	2.24E-09	2.24E-09	1.42E-10	1.42E-10	3.58E-08	2.27E-09	3.81E-08
Indeno(1,2,3-cd)pyrene	1.00E+00	0.29	0.02	7.30E-01	6.49E-10	6.49E-10	2.84E-10	2.84E-10	4.73E-10	2.07E-10	6.81E-10
Total 2,3,7,8-TCDD TEQ	1.00E+00	0.5	0.05	1.50E+05	1.12E-09	1.12E-09	7.09E-10	7.09E-10	1.68E-04	1.06E-04	2.74E-04
Total PCBs	1.00E+00	0.83	0.04	2.00E+00	1.86E-09	1.86E-09	5.68E-10	5.68E-10	3.71E-09	1.14E-09	4.85E-09

TABLE
POTENTIAL CARCINOGENIC RISK - RME
INCIDENTIAL INGESTION AND DERMAL CONTACT
SOIL
CONSTRUCTION WORKER RME
SAUGET AREA 1 - EE/CA AND RI/FS

Constituent	Reference Risk (per mg/kg)	Transect 3 EPC (mg/kg)	Transect 3 Risk	Transect 4 (a) EPC (mg/kg)	Transect 4 (a) Risk	Transect 6 (a) EPC (mg/kg)	Transect 6 (a) Risk	Transect 7 EPC (mg/kg)	Transect 7 Risk	Fill Area H EPC (mg/kg)	Fill Area H Risk	Fill Area I EPC (mg/kg)	Fill Area I Risk	Fill Area L EPC (mg/kg)	Fill Area L Risk
Arsenic	1.03E-09	--	NC	--	NC	--	NC	1.50E+01	1.54E-08	6.40E+01	6.58E-08	--	NC	3.70E+01	3.80E-08
Benzo(a)anthracene	6.81E-10	--	NC	5.90E+00	4.02E-09	--	NC	--	NC	--	NC	--	NC	--	NC
Benzo(a)pyrene	6.81E-09	2.60E-01	1.77E-09	3.50E+00	2.38E-08	3.60E+00	2.45E-08	2.10E+00	1.43E-08	--	NC	2.20E+00	1.50E-08	7.00E+00	4.76E-08
Benzo(b)fluoranthene	6.81E-10	--	NC	3.30E+00	2.25E-09	--	NC	--	NC	--	NC	--	NC	--	NC
Copper	NC	--	NC	--	NC	--	NC	--	NC	--	NC	1.30E+04	NC	--	NC
Dibenzo(a,h)anthracene	6.81E-09	--	NC	5.20E-01	3.54E-09	--	NC	--	NC	--	NC	--	NC	1.30E+00	8.85E-09
Dieldrin	3.81E-08	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Indeno(1,2,3-cd)pyrene	6.81E-10	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Total 2,3,7,8-TCDD TEQ	2.74E-04	--	NC	--	NC	--	NC	--	NC	1.30E-03	3.56E-07	1.20E-02	3.29E-06	--	NC
Total PCBs	4.85E-09	--	NC	--	NC	--	NC	--	NC	1.52E+00	7.37E-09	1.21E+02	5.88E-07	1.07E+00	5.19E-09
Total:			**1.77E-09**		**3.36E-08**		**2.45E-08**		**2.97E-08**		**4.30E-07**		**3.89E-06**		**9.97E-08**

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
(a) - Higher of surface soil and subsurface soil EPC used.

SAUGET AREA 1 - EE/CA AND RI/FS
RME
NONCARCINOGENIC HAZARD INDEX
INCIDENTIAL INGESTION AND DERMAL CONTACT
SOIL
CONSTRUCTION WORKER RME

Constituent	Unit Concentration in Soil (mg/kg-soil)	Oral - Soil Absorption Adjustment Factor	Dermal - Soil Absorption Adjustment Factor	Oral Reference Dose (mg/kg-day)	ADDing /E Construction Worker (mg/kg-day)	Chronic Average Daily Dose-Ing. (mg/kg-day)	ADDder /E Construction Worker (mg/kg-day)	Chronic Average Daily Dose-Der. (mg/kg-day)	Hazard Index - Ingestion	Hazard Index - Dermal Contact	Total Hazard Index
Arsenic	1.00E+00	0.3	0.001	3.00E-04	4.70E-08	4.70E-08	9.93E-10	9.93E-10	1.57E-04	3.31E-06	1.60E-04
Benzo(a)anthracene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Benzo(a)pyrene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Benzo(b)fluoranthene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Copper	1.00E+00	1	0.002	3.70E-02	1.57E-07	1.57E-07	1.99E-09	1.99E-09	4.23E-06	5.37E-08	4.28E-06
Dibenzo(a,h)anthracene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Dieldrin	1.00E+00	1	0.01	5.00E-05	1.57E-07	1.57E-07	9.93E-09	9.93E-09	3.13E-03	1.99E-04	3.33E-03
Indeno(1,2,3-cd)pyrene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Total 2,3,7,8-TCDD TEQ	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Total PCBs	1.00E+00	0.83	0.04	2.00E-05	1.30E-07	1.30E-07	3.97E-08	3.97E-08	6.50E-03	1.99E-03	8.48E-03

P-45

TABLE
POTENTIAL HAZARD INDEX - RME
INCIDENTIAL INGESTION AND DERMAL CONTACT
SOIL
CONSTRUCTION WORKER RME
SAUGET AREA 1 - EE/CA AND RI/FS

Constituent	Reference	Transect 3		Transect 4 (a)		Transect 6 (a)		Transect 7		Fill Area H		Fill Area I		Fill Area L	
	HI (per mg/kg)	EPC (mg/kg)	HQ	EPC (mg/kg)	HQ	EPC (mg/kg)	HQ	EPC (mg/kg)	HQ	EPC (mg/kg)	HQ	EPC (mg/kg)	HQ	EPC (mg/kg)	HQ
Arsenic	1.60E-04	--	NC	--	NC	--	NC	1.50E+01	2.39E-03	6.40E+01	1.02E-02	--	NC	3.70E+01	5.92E-03
Benzo(a)anthracene	NC	--	NC	5.90E+00	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Benzo(a)pyrene	NC	2.60E-01	NC	3.50E+00	NC	3.60E+00	NC	2.10E+00	NC	--	NC	2.20E+00	NC	7.00E+00	NC
Benzo(b)fluoranthene	NC	--	NC	3.30E+00	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Copper	4.28E-06	--	NC	--	NC	--	NC	--	NC	--	NC	1.30E+04	5.57E-02	--	NC
Dibenzo(a,h)anthracene	NC	--	NC	5.20E-01	NC	--	NC	--	NC	--	NC	--	NC	1.30E+00	NC
Dieldrin	3.33E-03	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Indeno(1,2,3-cd)pyrene	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Total 2,3,7,8-TCDD TEQ	NC	--	NC	--	NC	--	NC	--	NC	1.30E-03	NC	1.20E-02	NC	--	NC
Total PCBs	8.48E-03	--	NC	--	NC	--	NC	--	NC	1.52E+00	1.29E-02	1.21E+02	1.03E+00	1.07E+00	9.08E-03
	Total HI:		NC		NC		NC		2.39E-03		2.31E-02		1.08E+00		1.50E-02

Notes:
-- Not a constituent of concern in this area/medium.
EPC - Exposure Point Concentration.
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
(a) - Higher of surface soil and subsurface soil EPC used.

P-46

SAUGET AREA 1 - EE/CA AND RI/FS
RME

Receptors Evaluated:	
Receptor 1:	RME Construction Worker

ASSUMPTIONS FOR CONSTRUCTION WORKER - RME INHALATION OF OUTDOOR AIR PARTICULATES		Assumed Value	Units	Calculated Value
Inhalation Rate	RME Construction Worker	2.5	(m^3 air/hour)	
Body Weight	RME Construction Worker	70	(kg)	
Exposure Time	RME Construction Worker	8	(hrs/day) =	8.00E+00
Exposure Frequency	RME Construction Worker	40	(days)/365 (days) =	1.10E-01
Exposure Duration (cancer)	RME Construction Worker	1	(yrs)/70(yrs) =	1.43E-02
Exposure Duration (noncancer)	RME Construction Worker	1	(yrs)/1(yrs) =	1.00E+00
Lifetime		70	(years)	

SAUGET AREA 1 - EE/CA AND RI/FS
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR PARTICULATES
CONSTRUCTION WORKER - RME

Constituent	Unit Concentration In Air (mg/m^3 air)	Inhalation Absorption Adjustment Factor	Inhalation Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	ADDinh RME Construction Worker (mg/kg-day)	Lifetime Average Daily Dose - Inh. (mg/kg-day)	Excess Lifetime Cancer Risk - Inhalation
Arsenic	1.00E+00	1	1.50E+01	4.47E-04	4.47E-04	6.71E-03
Benzo(a)anthracene	1.00E+00	1	3.10E-01	4.47E-04	4.47E-04	1.39E-04
Benzo(a)pyrene	1.00E+00	1	3.10E+00	4.47E-04	4.47E-04	1.39E-03
Benzo(b)fluoranthene	1.00E+00	1	3.10E-01	4.47E-04	4.47E-04	1.39E-04
Copper	1.00E+00	NA	NA	NA	NA	NC
Dibenzo(a,h)anthracene	1.00E+00	1	3.10E+00	4.47E-04	4.47E-04	1.39E-03
Dieldrin	1.00E+00	1	1.61E+01	4.47E-04	4.47E-04	7.20E-03
Indeno(1,2,3-cd)pyrene	1.00E+00	1	3.10E-01	4.47E-04	4.47E-04	1.39E-04
Total 2,3,7,8-TCDD TEQ	1.00E+00	1	1.50E+05	4.47E-04	4.47E-04	6.71E+01
Total PCBs	1.00E+00	1	2.00E+00	4.47E-04	4.47E-04	8.95E-04

TABLE
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR PARTICULATES
CONSTRUCTION WORKER - RME

Constituent	Reference Risk (per mg/m3)	Transect 3		Transect 4 (a)		Transect 6 (a)		Transect 7		Fill Area H		Fill Area I		Fill Area L	
		EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk
Arsenic	6.71E-03	--	NC	--	NC	--	NC	8.99E-07	6.03E-09	3.84E-06	2.58E-08	--	NC	2.22E-06	1.49E-08
Benzo(a)anthracene	1.39E-04	--	NC	3.54E-07	4.91E-11	--	NC	--	NC	--	NC	--	NC	--	NC
Benzo(a)pyrene	1.39E-03	1.56E-08	2.16E-11	2.10E-07	2.91E-10	2.16E-07	3.00E-10	1.26E-07	1.75E-10	--	NC	1.32E-07	1.83E-10	4.20E-07	5.82E-10
Benzo(b)fluoranthene	1.39E-04	--	NC	1.98E-07	2.75E-11	--	NC	--	NC	--	NC	--	NC	--	NC
Copper	NC	--	NC	--	NC	--	NC	--	NC	--	NC	7.80E-04	NC	--	NC
Dibenzo(a,h)anthracene	1.39E-03	--	NC	3.12E-08	4.33E-11	--	NC	--	NC	--	NC	--	NC	7.80E-08	1.08E-10
Dieldrin	7.20E-03	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Indeno(1,2,3-cd)pyrene	1.39E-04	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Total 2,3,7,8-TCDD TEQ	6.71E+01	--	NC	--	NC	--	NC	--	NC	7.80E-11	5.23E-09	7.20E-10	4.83E-08	--	NC
Total PCBs	8.95E-04	--	NC	--	NC	--	NC	--	NC	9.12E-08	8.16E-11	7.28E-06	6.51E-09	6.42E-08	5.74E-11
	Total:		**2.16E-11**		**4.11E-10**		**3.00E-10**		**6.21E-09**		**3.11E-08**		**5.50E-08**		**1.56E-08**

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
(a) - Higher of the surface soil and subsurface soil EPC used.

SAUGET AREA 1 - EE/CA AND RI/FS
NONCARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR PARTICULATES
CONSTRUCTION WORKER - RME

Constituent	Unit Concentration In Air (mg/m³ air)	Inhalation Absorption Adjustment Factor	Inhalation Reference Dose (mg/kg-day)	ADDinh RME Construction Worker (mg/kg-day)	Chronic Average Daily Dose-Inh (mg/kg-day)	Hazard Index - Inhalation
Arsenic	*1.00E+00*	NA	NA	NA	NA	NC
Benzo(a)anthracene	1.00E+00	NA	NA	NA	NA	NC
Benzo(a)pyrene	1.00E+00	NA	NA	NA	NA	NC
Benzo(b)fluoranthene	1.00E+00	NA	NA	NA	NA	NC
Copper	1.00E+00	NA	NA	NA	NA	NC
Dibenzo(a,h)anthracene	1.00E+00	NA	NA	NA	NA	NC
Dieldrin	1.00E+00	NA	NA	NA	NA	NC
Indeno(1,2,3-cd)pyrene	1.00E+00	NA	NA	NA	NA	NC
Total 2,3,7,8-TCDD TEQ	1.00E+00	NA	NA	NA	NA	NC
Total PCBs	1.00E+00	NA	NA	NA	NA	NC

P-50

Receptors Evaluated:	
Receptor 3:	RME Construction Worker

ASSUMPTIONS FOR CONSTRUCTION WORKER-RME INCIDENTAL INGESTION AND DERMAL CONTACT GROUNDWATER		Assumed Value	Units	Calculated Value
Water Ingestion Rate	RME Construction Worker	0.005	(l/day)	
Skin Exposed	RME Construction Worker	3339	(cm^2)	
Body Weight	RME Construction Worker	70	(kg)	
Exposure Time (dermal route only)	RME Construction Worker	1	(hr/day)	
Exposure Frequency	RME Construction Worker	10	(days)/365 (days) =	2.74E-02
Exposure Duration (cancer)	RME Construction Worker	1	(yrs)/ 70(yrs) =	1.43E-02
Exposure Duration (noncancer)	RME Construction Worker	1	(yrs)/ 1(yrs) =	1.00E+00
Lifetime		70	(years)	
Unit Conversion Factor (dermal route only)		0.001	(l/cm^3)	

22-Dec-00

P-51

SAUGET AREA 1 - EE/CA AND RI/FS
RME
CARCINOGENIC ASSESSMENT
INCIDENTAL INGESTION AND DERMAL CONTACT
GROUNDWATER
CONSTRUCTION WORKER - RME

Constituent	Unit Concentration In Groundwater (mg/l)	Oral - Water Absorption Adjustment Factor	Dermal - Water Absorption Adjustment Factor	Dermal Permeability Constant (cm/hr)	Oral Cancer Slope Factor (mg/kg-day)⁻¹	ADDing Construction Worker (mg/kg-day)	Lifetime Average Daily Dose-Ing. (mg/kg-day)	ADDder Construction Worker (mg/kg-day)	Lifetime Average Daily Dose-Der. (mg/kg-day)	Excess Lifetime Cancer Risk - Ingestion	Excess Lifetime Cancer Risk - Dermal Contact	Total Excess Lifetime Cancer Risk
1,1,2,2-Tetrachloroethane	1.00E+00	1	1	9.00E-03	2.00E-01	2 80E-08	2.80E-08	1.68E-07	1.68E-07	5.59E-09	3.36E-08	3.92E-08
1,4-Dichlorobenzene	1.00E+00	1	1	6 20E-02	2.40E-02	2.80E-08	2.80E-08	1.16E-06	1.16E-06	6.71E-10	2.78E-08	2.85E-08
2,4,5-TP (Silvex)	1.00E+00	NA	NA	2.33E-03	NA	NA	NA	NA	NA	NA	NA	NC
2,4,6-Trichlorophenol	1.00E+00	1	1	5.00E-02	1.10E-02	2.80E-08	2.80E-08	9.33E-07	9.33E-07	3.08E-10	1.03E-08	1.06E-08
2,4-Dichlorophenol	1.00E+00	NA	NA	2.30E-02	NA	NA	NA	NA	NA	NA	NA	NC
2-Chlorophenol	1.00E+00	NA	NA	1.10E-02	NA	NA	NA	NA	NA	NA	NA	NC
2-Nitroaniline	1.00E+00	NA	NA	5.45E-03	NA	NA	NA	NA	NA	NA	NA	NC
3-Methylphenol/4-Methylphenol	1.00E+00	NA	NA	1.00E-02	NA	NA	NA	NA	NA	NA	NA	NC
4,4-DDE	1.00E+00	1	1	2.40E-01	3.40E-01	2.80E-08	2.80E-08	4.48E-06	4.48E-06	9.51E-09	1.52E-06	1.53E-06
4-Chloroaniline	1.00E+00	NA	NA	6.33E-03	NA	NA	NA	NA	NA	NA	NA	NC
4-Methyl-2-pentanone	1.00E+00	NA	NA	2.77E-03	NA	NA	NA	NA	NA	NA	NA	NC
4-Nitroaniline	1.00E+00	NA	NA	2.66E-03	NA	NA	NA	NA	NA	NA	NA	NC
alpha-BHC	1.00E+00	1	1	1.63E-02	6.30E+00	2.80E-08	2.80E-08	3.04E-07	3.04E-07	1.76E-07	1.92E-06	2.09E-06
Antimony	1.00E+00	NA	NA	1.60E-04	NA	NA	NA	NA	NA	NA	NA	NC
Arsenic	1.00E+00	1	1	1.60E-04	1.50E+00	2.80E-08	2.80E-08	2.99E-09	2.99E-09	4.19E-08	4.48E-09	4.64E-08
Benzene	1.00E+00	1	2.13	2.10E-02	1.50E-02	2.80E-08	2.80E-08	8.35E-07	8.35E-07	4.19E-10	1.25E-08	1.29E-08
Benzo(k)fluoranthene	1.00E+00	1	1	1.20E+00	7.30E-02	2.80E-08	2.80E-08	2.24E-05	2.24E-05	2.04E-09	1.64E-06	1.64E-06
beta-BHC	1.00E+00	1	1	1.60E-02	1.80E+00	2.80E-08	2.80E-08	2.99E-07	2.99E-07	5.03E-08	5.38E-07	5.88E-07
Cadmium	1.00E+00	NA	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NC
Carbazole	1.00E+00	1	1	7.97E-02	2.00E-02	2.80E-08	2.80E-08	1 49E-06	1.49E-06	5.59E-10	2.98E-08	3.03E-08
Chlorobenzene	1.00E+00	NA	NA	4.10E-02	NA	NA	NA	NA	NA	NA	NA	NC
Chloroform	1.00E+00	1	1	8.90E-03	6.10E-03	2.80E-08	2.80E-08	1.66E-07	1.66E-07	1.71E-10	1.01E-09	1.18E-09
Cis/Trans-1,2-Dichloroethene	1.00E+00	NA	NA	1.00E-02	NA	NA	NA	NA	NA	NA	NA	NC
delta-BHC	1.00E+00	NA	NA	1.60E-02	NA	NA	NA	NA	NA	NA	NA	NC
Ethylbenzene	1.00E+00	NA	NA	7.40E-02	NA	NA	NA	NA	NA	NA	NA	NC
Heptachlor	1.00E+00	1	1	1.10E-02	4.50E+00	2.80E-08	2.80E-08	2.05E-07	2.05E-07	1.26E-07	9.24E-07	1.05E-06
Heptachlor epoxide	1.00E+00	1	1	1.10E-02	9.10E+00	2.80E-08	2.80E-08	2.05E-07	2.05E-07	2.54E-07	1.87E-06	2.12E-06
Molybdenum	1.00E+00	NA	NA	1.60E-04	NA	NA	NA	NA	NA	NA	NA	NC
Naphthalene	1.00E+00	NA	NA	6.90E-02	NA	NA	NA	NA	NA	NA	NA	NC
Nickel	1.00E+00	NA	NA	5.45E-05	NA	NA	NA	NA	NA	NA	NA	NC
Nitrobenzene	1.00E+00	NA	NA	6.96E-03	NA	NA	NA	NA	NA	NA	NA	NC
Pentachlorophenol	1.00E+00	1	1	6.50E-01	1.20E-01	2.80E-08	2.80E-08	1.21E-05	1.21E-05	3.35E-09	1.46E-06	1.46E-06
Phenol	1.00E+00	NA	NA	5.50E-03	NA	NA	NA	NA	NA	NA	NA	NC
Tetrachloroethene	1.00E+00	1	1	4.80E-02	5.20E-02	2.80E-08	2.80E-08	8.96E-07	8.96E-07	1.45E-09	4.66E-08	4.81E-08
Toluene	1.00E+00	NA	NA	4.50E-02	NA	NA	NA	NA	NA	NA	NA	NC
Total 2,3,7,8-TCDD TEQ	1.00E+00	1	1.8	1.40E+00	1.50E+05	2.80E-08	2.80E-08	4.70E-05	4.70E-05	4.19E-03	7.06E+00	7.06E+00
Total PCBs	1.00E+00	1	1.1	7.10E-01	2.00E+00	2.80E-08	2.80E-08	1.46E-05	1.46E-05	5.59E-08	2.92E-05	2.92E-05
Trichloroethene	1.00E+00	1	1	1.60E-02	1.10E-02	2.80E-08	2.80E-08	2.99E-07	2.99E-07	3.08E-10	3.29E-09	3.59E-09
Vanadium	1.00E+00	NA	NA	1.60E-04	NA	NA	NA	NA	NA	NA	NA	NC
Vinyl chloride	1.00E+00	1	1	7.30E-03	7.20E-01	2 80E-08	2.80E-08	1.36E-07	1.36E-07	2.01E-08	9.81E-08	1.18E-07
Zinc	1.00E+00	NA	NA	6.00E-04	NA	NA	NA	NA	NA	NA	NA	NC

P-52

TABLE
POTENTIAL CARCINOGENIC RISK - RME
INCIDENTAL INGESTION AND DERMAL CONTACT
GROUNDWATER
CONSTRUCTION WORKER- RME

Constituent	Reference Risk (per mg/L)	Fill Area G							Fill Area H						
		EE-05		EEG-106		EEG-107			EE-01		EE-02		EE-03		
		EPC (mg/L)	Risk (a)	EPC (mg/L)	Risk (a)	EPC (mg/L)	Risk (a)	Total	EPC (mg/L)	Risk (a)	EPC (mg/L)	Risk (a)	EPC (mg/L)	Risk (a)	Total
1,1,2,2-Tetrachloroethane	3 92E-08	--	NC	--	NC	--	NC	NC	1 20E-02	1.57E-10	--	NC	--	NC	1.57E-10
1,4-Dichlorobenzene	2 85E-08	--	NC	--	NC	8 50E-01	8 06E-09	8.06E-09	2 20E+00	2.09E-08	6.35E-01	6.02E-09	--	NC	2.69E-08
2,4,5-TP (Silvex)	NC	3 90E-01	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
2,4,6-Trichlorophenol	1.06E-08	--	NC	--	NC	--	NC	NC	2.70E-01	9.52E-10	4.65E-01	1.64E-09	--	NC	2 59E-09
2,4-Dichlorophenol	NC	--	NC	--	NC	3 60E+00	NC	NC	--	NC	3.70E-01	NC	--	NC	NC
2-Chlorophenol	NC	--	NC	--	NC	6 30E-01	NC	NC	--	NC	--	NC	--	NC	NC
2-Nitroaniline	NC	--	NC	--	NC	--	NC	NC	--	NC	1 35E-02	NC	--	NC	NC
3-Methylphenol/4-Methylphenol	NC	--	NC	--	NC	2.40E+00	NC	NC	--	NC	--	NC	--	NC	NC
4,4-DDE	1.53E-06	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
4-Chloroaniline	NC	1 60E+00	NC	--	NC	2.30E+01	NC	NC	1.80E+00	NC	7 75E-01	NC	--	NC	NC
4-Methyl-2-pentanone	NC	--	NC	--	NC	1.30E+00	NC	NC	--	NC	--	NC	--	NC	NC
4-Nitroaniline	NC	8 40E-03	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
alpha-BHC	2.09E-06	--	NC	8 30E-03	5 79E-09	6 00E-03	4.19E-09	9 98E-09	--	NC	4.95E-04	3 45E-10	--	NC	3.45E-10
Antimony	NC	--	NC	--	NC	--	NC	NC	--	NC	1.05E-01	NC	--	NC	NC
Arsenic	4 64E-08	--	NC	--	NC	--	NC	NC	--	NC	1.25E+00	1.93E-08	--	NC	1.93E-08
Benzene	1 29E-08	1.10E-01	4 75E-10	--	NC	3.70E+00	1.60E-08	1.64E-08	1 50E+00	6 47E-09	2.25E+00	9.71E-09	--	NC	1.62E-08
Benzo(k)fluoranthene	1.64E-06	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
beta-BHC	5 88E-07	--	NC	3 60E-04	7.06E-11	--	NC	7.06E-11	--	NC	--	NC	--	NC	NC
Cadmium	NC	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
Carbazole	3.03E-08	--	NC	--	NC	--	NC	NC	5 20E-03	5.26E-11	--	NC	--	NC	5.26E-11
Chlorobenzene	NC	6 20E-01	NC	--	NC	4.30E+00	NC	NC	1.20E+00	NC	4.35E+00	NC	--	NC	NC
Chloroform	1.18E-09	--	NC	--	NC	--	NC	NC	--	NC	4 25E-01	1 68E-10	--	NC	1.68E-10
Cis/Trans-1,2-Dichloroethene	NC	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
delta-BHC	NC	3.60E-04	NC	--	NC	1 70E-02	NC	NC	--	NC	--	NC	--	NC	NC
Ethylbenzene	NC	--	NC	--	NC	--	NC	NC	1.80E+00	NC	--	NC	--	NC	NC
Heptachlor	1 05E-06	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
Heptachlor epoxide	2 12E-06	--	NC	--	NC	--	NC	NC	--	NC	4.40E-03	3.11E-09	--	NC	3.11E-09
Molybdenum	NC	4.50E-01	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
Naphthalene	NC	3 90E-01	NC	--	NC	2.10E+00	NC	NC	2.30E+00	NC	1.95E-01	NC	--	NC	NC
Nickel	NC	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
Nitrobenzene	NC	--	NC	--	NC	--	NC	NC	--	NC	5 65E-02	NC	--	NC	NC
Pentachlorophenol	1.46E-06	--	NC	--	NC	2.00E+00	9.73E-07	9.73E-07	4.30E+00	2 09E-06	6 70E-01	3 26E-07	--	NC	2 42E-06
Phenol	NC	3 80E-01	NC	--	NC	1 40E+01	NC	NC	--	NC	3 15E-01	NC	--	NC	NC
Tetrachloroethene	4.81E-08	--	NC	--	NC	1.70E-01	2.72E-09	2 72E-09	--	NC	--	NC	--	NC	NC
Toluene	NC	--	NC	--	NC	8 50E+00	NC	NC	--	NC	--	NC	--	NC	NC
Total 2,3,7,8-TCDD TEQ	7.06E+00	1 78E-07	4 19E-07	--	NC	3.60E-06	8.47E-06	8.89E-06	4.57E-08	1.08E-07	--	NC	5.02E-08	1.18E-07	2 26E-07
Total PCBs	2 92E-05	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
Trichloroethene	3 59E-09	--	NC	--	NC	2.00E-01	2.40E-10	2.40E-10	--	NC	4.95E-02	5.93E-11	--	NC	5.93E-11
Vanadium	NC	--	NC	--	NC	3 30E-01	NC	NC	--	NC	--	NC	--	NC	NC
Vinyl chloride	1 18E-07	--	NC	--	NC	4.10E-02	1.62E-09	1.62E-09	--	NC	--	NC	--	NC	NC
Zinc	NC	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
	Total:		4.19E-07		5.86E-09		9.48E-06	9.90E-06		2.23E-06		3.66E-07		1.18E-07	2.71E-06

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium
(a) - Risks divided by the number of wells in this area

RME construction groundwater.xls\c scale

SAUGET AREA 1 - EE/CA AND RI/FS
RME
NONCARCINOGENIC ASSESSMENT
INCIDENTAL INGESTION AND DERMAL CONTACT
GROUNDWATER
CONSTRUCTION WORKER - RME

Constituent	Unit Concentration In Groundwater (mg/l)	Oral - Water Absorption Adjustment Factor	Dermal - Water Absorption Adjustment Factor	Dermal Permeability Constant (cm/hr)	Oral Reference Dose (mg/kg-day)	ADDing Construction Worker (mg/kg-day)	Chronic Average Daily Dose-Ing. (mg/kg-day)	ADDder Construction Worker (mg/kg-day)	Chronic Average Daily Dose-Der. (mg/kg-day)	Hazard Index - Ingestion	Hazard Index - Dermal Contact	Total Hazard Index
1,1,2,2-Tetrachloroethane	1.00E+00	1	1	9.00E-03	6.00E-02	1.96E-06	1.96E-06	1.18E-05	1.18E-05	3.26E-05	1.96E-04	2.29E-04
1,4-Dichlorobenzene	1.00E+00	1	1	6.20E-02	3.00E-02	1.96E-06	1.96E-06	8.10E-05	8.10E-05	6.52E-05	2.70E-03	2.77E-03
2,4,5-TP (Silvex)	1.00E+00	1	1	2.33E-03	8.00E-03	1.96E-06	1.96E-06	3.04E-06	3.04E-06	2.45E-04	3.81E-04	6.25E-04
2,4,6-Trichlorophenol	1.00E+00	NA	NA	5.00E-02	NA	NA	NA	NA	NA	NA	NA	NC
2,4-Dichlorophenol	1.00E+00	1	1	2.30E-02	3.00E-03	1.96E-06	1.96E-06	3.01E-05	3.01E-05	6.52E-04	1.00E-02	1.07E-02
2-Chlorophenol	1.00E+00	1	1	1.10E-02	5.00E-03	1.96E-06	1.96E-06	1.44E-05	1.44E-05	3.91E-04	2.88E-03	3.27E-03
2-Nitroaniline	1.00E+00	NA	NA	5.45E-03	NA	NA	NA	NA	NA	NA	NA	NC
3-Methylphenol/4-Methylphenol	1.00E+00	1	1	1.00E-02	5.00E-02	1.96E-06	1.96E-06	1.31E-05	1.31E-05	3.91E-05	2.61E-04	3.01E-04
4,4-DDE	1.00E+00	NA	NA	2.40E-01	NA	NA	NA	NA	NA	NA	NA	NC
4-Chloroaniline	1.00E+00	1	1	6.33E-03	4.00E-03	1.96E-06	1.96E-06	8.27E-06	8.27E-06	4.89E-04	2.07E-03	2.56E-03
4-Methyl-2-pentanone	1.00E+00	1	1	2.77E-03	8.00E-02	1.96E-06	1.96E-06	3.62E-06	3.62E-06	2.45E-05	4.52E-05	6.97E-05
4-Nitroaniline	1.00E+00	NA	NA	2.66E-03	NA	NA	NA	NA	NA	NA	NA	NC
alpha-BHC	1.00E+00	NA	NA	1.63E-02	NA	NA	NA	NA	NA	NA	NA	NC
Antimony	1.00E+00	1	6.7	1.60E-04	4.00E-04	1.96E-06	1.96E-06	1.40E-06	1.40E-06	4.89E-03	3.50E-03	8.39E-03
Arsenic	1.00E+00	1	1	1.60E-04	3.00E-04	1.96E-06	1.96E-06	2.09E-07	2.09E-07	6.52E-03	6.97E-04	7.22E-03
Benzene	1.00E+00	1	2.13	2.10E-02	3.00E-03	1.96E-06	1.96E-06	5.85E-05	5.85E-05	6.52E-04	1.95E-02	2.01E-02
Benzo(k)fluoranthene	1.00E+00	NA	NA	1.20E+00	NA	NA	NA	NA	NA	NA	NA	NC
beta-BHC	1.00E+00	NA	NA	1.60E-02	NA	NA	NA	NA	NA	NA	NA	NC
Cadmium	1.00E+00	1	40	1.00E-03	5.00E-04	1.96E-06	1.96E-06	5.23E-05	5.23E-05	3.91E-03	1.05E-01	1.08E-01
Carbazole	1.00E+00	NA	NA	7.97E-02	NA	NA	NA	NA	NA	NA	NA	NC
Chlorobenzene	1.00E+00	1	1	4.10E-02	2.00E-02	1.96E-06	1.96E-06	5.36E-05	5.36E-05	9.78E-05	2.68E-03	2.78E-03
Chloroform	1.00E+00	1	1	8.90E-03	1.00E-02	1.96E-06	1.96E-06	1.16E-05	1.16E-05	1.96E-04	1.16E-03	1.36E-03
Cis/Trans-1,2-Dichloroethene	1.00E+00	1	1	1.00E-02	1.00E-02	1.96E-06	1.96E-06	1.31E-05	1.31E-05	1.96E-04	1.31E-03	1.50E-03
delta-BHC	1.00E+00	1	1	1.60E-02	3.00E-04	1.96E-06	1.96E-06	2.09E-05	2.09E-05	6.52E-03	6.97E-02	7.62E-02
Ethylbenzene	1.00E+00	1	1	7.40E-02	1.00E-01	1.96E-06	1.96E-06	9.67E-05	9.67E-05	1.96E-05	9.67E-04	9.87E-04
Heptachlor	1.00E+00	1	1	1.10E-02	5.00E-04	1.96E-06	1.96E-06	1.44E-05	1.44E-05	3.91E-03	2.88E-02	3.27E-02
Heptachlor epoxide	1.00E+00	1	1	1.10E-02	1.30E-05	1.96E-06	1.96E-06	1.44E-05	1.44E-05	1.51E-01	1.11E+00	1.26E+00
Molybdenum	1.00E+00	1	1	1.60E-04	5.00E-03	1.96E-06	1.96E-06	2.09E-07	2.09E-07	3.91E-04	4.18E-05	4.33E-04
Naphthalene	1.00E+00	1	1	6.90E-02	2.00E-02	1.96E-06	1.96E-06	9.02E-05	9.02E-05	9.78E-05	4.51E-03	4.61E-03
Nickel	1.00E+00	1	77	5.45E-05	2.00E-02	1.96E-06	1.96E-06	5.48E-06	5.48E-06	9.78E-05	2.74E-04	3.72E-04
Nitrobenzene	1.00E+00	1	1	6.96E-03	5.00E-04	1.96E-06	1.96E-06	9.10E-06	9.10E-06	3.91E-03	1.82E-02	2.21E-02
Pentachlorophenol	1.00E+00	1	1	6.50E-01	3.00E-02	1.96E-06	1.96E-06	8.49E-04	8.49E-04	6.52E-05	2.83E-02	2.84E-02
Phenol	1.00E+00	1	1	5.50E-03	6.00E-01	1.96E-06	1.96E-06	7.19E-06	7.19E-06	3.26E-06	1.20E-05	1.52E-05
Tetrachloroethene	1.00E+00	1	1	4.80E-02	1.00E-02	1.96E-06	1.96E-06	6.27E-05	6.27E-05	1.96E-04	6.27E-03	6.47E-03
Toluene	1.00E+00	1	1	4.50E-02	2.00E-01	1.96E-06	1.96E-06	5.88E-05	5.88E-05	9.78E-06	2.94E-04	3.04E-04
Total 2,3,7,8-TCDD TEQ	1.00E+00	NA	NA	1.40E+00	NA	NA	NA	NA	NA	NA	NA	NC
Total PCBs	1.00E+00	1	1.1	7.10E-01	2.00E-05	1.96E-06	1.96E-06	1.02E-03	1.02E-03	9.78E-02	5.10E+01	5.11E+01
Trichloroethene	1.00E+00	1	1	1.60E-02	6.00E-03	1.96E-06	1.96E-06	2.09E-05	2.09E-05	3.26E-04	3.48E-03	3.81E-03
Vanadium	1.00E+00	1	10	1.60E-04	7.00E-03	1.96E-06	1.96E-06	2.09E-06	2.09E-06	2.80E-04	2.99E-04	5.78E-04
Vinyl chloride	1.00E+00	1	1	7.30E-03	3.00E-03	1.96E-06	1.96E-06	9.54E-06	9.54E-06	6.52E-04	3.18E-03	3.83E-03
Zinc	1.00E+00	1.6	3.03	6.00E-04	3.00E-01	3.13E-06	3.13E-06	2.38E-06	2.38E-06	1.04E-05	7.92E-06	1.84E-05

P-54

TABLE
POTENTIAL HAZARD INDEX - RME
INCIDENTAL INGESTION AND DERMAL CONTACT
GROUNDWATER
CONSTRUCTION WORKER- RME

	Reference	Fill Area G							Fill Area H						
	HQ	EE-05		EEG-106		EEG-107			EE-01		EE-02		EE-03		
Constituent	(per mg/L)	EPC (mg/L)	HQ (a)	EPC (mg/L)	HQ (a)	EPC (mg/L)	HQ (a)	Total	EPC (mg/L)	HQ (a)	EPC (mg/L)	HQ (a)	EPC (mg/L)	HQ (a)	Total
1,1,2,2-Tetrachloroethane	2.29E-04	--	NC	--	NC	--	NC	NC	1.20E-02	9.15E-07	--	NC	--	NC	9.15E-07
1,4-Dichlorobenzene	2.77E-03	--	NC	--	NC	8.50E-01	7.84E-04	7.84E-04	2.20E+00	2.03E-03	6.35E-01	5.85E-04	--	NC	2.61E-03
2,4,5-TP (Silvex)	6.25E-04	3.90E-01	8.13E-05	--	NC	--	NC	8.13E-05	--	NC	--	NC	--	NC	NC
2,4,6-Trichlorophenol	NC	--	NC	--	NC	--	NC	NC	2.70E-01	NC	4.65E-01	NC	--	NC	NC
2,4-Dichlorophenol	1.07E-02	--	NC	--	NC	3.60E+00	1.28E-02	1.28E-02	--	NC	3.70E-01	1.32E-03	--	NC	1.32E-03
2-Chlorophenol	3.27E-03	--	NC	--	NC	6.30E-01	6.66E-04	6.66E-04	--	NC	--	NC	--	NC	NC
2-Nitroaniline	NC	--	NC	--	NC	--	NC	NC	--	NC	1.35E-02	NC	--	NC	NC
3-Methylphenol/4-Methylphenol	3.01E-04	--	NC	--	NC	2.40E+00	2.40E-04	2.40E-04	--	NC	--	NC	--	NC	NC
4,4-DDE	NC	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
4-Chloroaniline	2.56E-03	1.60E+00	1.36E-03	--	NC	2.30E+01	1.96E-02	2.10E-02	1.80E+00	1.53E-03	7.75E-01	6.61E-04	--	NC	2.20E-03
4-Methyl-2-pentanone	6.97E-05	--	NC	--	NC	1.30E+00	3.02E-05	3.02E-05	--	NC	--	NC	--	NC	NC
4-Nitroaniline	NC	8.40E-03	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
alpha-BHC	NC	--	NC	8.30E-03	NC	6.00E-03	NC	NC	--	NC	4.95E-04	NC	--	NC	NC
Antimony	8.39E-03	--	NC	--	NC	--	NC	NC	--	NC	1.05E-01	2.94E-04	--	NC	2.94E-04
Arsenic	7.22E-03	--	NC	--	NC	--	NC	NC	--	NC	1.25E+00	3.01E-03	--	NC	3.01E-03
Benzene	2.01E-02	1.10E-01	7.38E-04	--	NC	3.70E+00	2.48E-02	2.56E-02	1.50E+00	1.01E-02	2.25E+00	1.51E-02	--	NC	2.52E-02
Benzo(k)fluoranthene	NC	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
beta-BHC	NC	--	NC	3.60E-04	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
Cadmium	1.08E-01	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
Carbazole	NC	--	NC	--	NC	--	NC	NC	5.20E-03	NC	--	NC	--	NC	NC
Chlorobenzene	2.78E-03	6.20E-01	5.74E-04	--	NC	4.30E+00	3.98E-03	4.55E-03	1.20E+00	1.11E-03	4.35E+00	4.03E-03	--	NC	5.14E-03
Chloroform	1.36E-03	--	NC	--	NC	--	NC	NC	--	NC	4.25E-01	1.92E-04	--	NC	1.92E-04
Cis/Trans-1,2-Dichloroethene	1.50E-03	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
delta-BHC	7.62E-02	3.60E-04	9.15E-06	--	NC	1.70E-02	4.32E-04	4.41E-04	--	NC	--	NC	--	NC	NC
Ethylbenzene	9.87E-04	--	NC	--	NC	--	NC	NC	1.80E+00	5.92E-04	--	NC	--	NC	5.92E-04
Heptachlor	3.27E-02	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
Heptachlor epoxide	1.26E+00	--	NC	--	NC	--	NC	NC	--	NC	4.40E-03	1.84E-03	--	NC	1.84E-03
Molybdenum	4.33E-04	4.50E-01	6.50E-05	--	NC	--	NC	6.50E-05	--	NC	--	NC	--	NC	NC
Naphthalene	4.61E-03	3.90E-01	5.99E-04	--	NC	2.10E+00	3.22E-03	3.82E-03	2.30E+00	3.53E-03	1.95E-01	2.99E-04	--	NC	3.83E-03
Nickel	3.72E-04	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
Nitrobenzene	2.21E-02	--	NC	--	NC	--	NC	NC	--	NC	5.65E-02	4.16E-04	--	NC	4.16E-04
Pentachlorophenol	2.84E-02	--	NC	--	NC	2.00E+00	1.69E-02	1.69E-02	4.30E+00	4.07E-02	6.70E-01	6.34E-03	--	NC	4.70E-02
Phenol	1.52E-05	3.80E-01	1.93E-06	--	NC	1.40E+01	7.11E-05	7.31E-05	--	NC	3.15E-01	1.60E-06	--	NC	1.60E-06
Tetrachloroethene	6.47E-03	--	NC	--	NC	1.70E-01	3.67E-04	3.67E-04	--	NC	--	NC	--	NC	NC
Toluene	3.04E-04	--	NC	--	NC	8.50E+00	8.61E-04	8.61E-04	--	NC	--	NC	--	NC	NC
Total 2,3,7,8-TCDD TEQ	NC	1.78E-07	NC	--	NC	3.60E-06	NC	NC	4.57E-08	NC	--	NC	5.02E-08	NC	NC
Total PCBs	5.11E+01	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
Trichloroethene	3.81E-03	--	NC	--	NC	2.00E-01	2.54E-04	2.54E-04	--	NC	4.95E-02	6.29E-05	--	NC	6.29E-05
Vanadium	5.78E-04	--	NC	--	NC	3.30E-01	6.36E-05	6.36E-05	--	NC	--	NC	--	NC	NC
Vinyl chloride	3.83E-03	--	NC	--	NC	4.10E-02	5.24E-05	5.24E-05	--	NC	--	NC	--	NC	NC
Zinc	1.84E-05	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
	Total HI:		3.43E-03		NC		8.72E-02	9.06E-02		5.95E-02		3.41E-02		NC	9.37E-02

Notes:
-- Not a constituent of potential concern in this area/medium
EPC - Exposure Point Concentration
HI - Hazard Index
HQ - Hazard Quotient
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium
(a) - HQ divided by the number of wells in this area.

P-55

TABLE
POTENTIAL HAZARD INDEX - RME
INCIDENTAL INGESTION AND DERMAL CONTACT
GROUNDWATER
CONSTRUCTION WORKER- RME

Constituent	Reference HQ (per mg/L)	Fill Area I													Fill Area L	
		AA-I-S1		AA-I-S2		EE-12		EE-13		EE-14		EE-15			EE-109	
		EPC (mg/L)	HQ (a)	EPC (mg/L)	HQ (a)	EPC (mg/L)	HQ (a)	EPC (mg/L)	HQ (a)	EPC (mg/L)	HQ (a)	EPC (mg/L)	HQ (a)	Total	EPC (mg/L)	HQ (a)
1,1,2,2-Tetrachloroethane	2 29E-04	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
1,4-Dichlorobenzene	2 77E-03	4.40E+00	2 03E-03	4 20E+00	1.94E-03	--	NC	--	NC	1 40E+01	6 45E-03	4.30E-01	1.98E-04	1.06E-02	--	NC
2,4,5-TP (Silvex)	6 25E-04	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
2,4,6-Trichlorophenol	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
2,4-Dichlorophenol	1 07E-02	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	2 60E-02	2.77E-04
2-Chlorophenol	3.27E-03	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
2-Nitroaniline	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
3-Methylphenol/4-Methylphenol	3 01E-04	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
4,4-DDE	NC	--	NC	--	NC	2 20E-03	NC	--	NC	--	NC	--	NC	NC	--	NC
4-Chloroaniline	2 56E-03	4.10E+00	1.75E-03	6.80E-01	2.90E-04	1.40E+00	5.97E-04	--	NC	1.80E+00	7.67E-04	--	NC	3 40E-03	5.50E-02	1.41E-04
4-Methyl-2-pentanone	6 97E-05	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
4-Nitroaniline	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
alpha-BHC	NC	--	NC	--	NC	2.45E-03	NC	--	NC	1.10E-03	NC	--	NC	NC	--	NC
Antimony	8.39E-03	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Arsenic	7 22E-03	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	4.30E+00	3.10E-02
Benzene	2.01E-02	6.20E-01	2.08E-03	1.20E-01	4.03E-04	6.80E-01	2.28E-03	--	NC	7.50E-01	2.52E-03	--	NC	7.28E-03	4.40E-02	6.86E-04
Benzo(k)fluoranthene	NC	--	NC	1.20E-03	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
beta-BHC	NC	--	NC	--	NC	--	NC	--	NC	1.00E-03	NC	--	NC	NC	--	NC
Cadmium	1.08E-01	--	NC	7.00E-02	1.27E-03	--	NC	--	NC	--	NC	--	NC	1.27E-03	--	NC
Carbazole	NC	--	NC	--	NC	3.50E-03	NC	--	NC	2.60E-02	NC	--	NC	NC	--	NC
Chlorobenzene	2.78E-03	8.70E+00	4.03E-03	3.20E+00	1.48E-03	1.40E+00	6.48E-04	--	NC	3.80E+00	1.76E-03	--	NC	7.91E-03	--	NC
Chloroform	1.36E-03	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	7.60E-02	1.03E-04
Cis/Trans-1,2-Dichloroethene	1.50E-03	1 20E+00	3 01E-04	5.10E-01	1.28E-04	--	NC	--	NC	--	NC	--	NC	4 28E-04	--	NC
delta-BHC	7.62E-02	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Ethylbenzene	9 87E-04	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Heptachlor	3.27E-02	--	NC	--	NC	2 50E-03	1.36E-05	--	NC	--	NC	--	NC	1.36E-05	--	NC
Heptachlor epoxide	1.26E+00	--	NC	--	NC	5 60E-03	1 17E-03	--	NC	--	NC	--	NC	1 17E-03	--	NC
Molybdenum	4 33E-04	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Naphthalene	4 61E-03	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Nickel	3 72E-04	--	NC	7 80E+00	4 84E-04	--	NC	--	NC	--	NC	--	NC	4 84E-04	1.80E+02	6.70E-02
Nitrobenzene	2 21E-02	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Pentachlorophenol	2.84E-02	--	NC	--	NC	--	NC	--	NC	5.00E-01	2.37E-03	--	NC	2.37E-03	--	NC
Phenol	1.52E-05	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Tetrachloroethene	6 47E-03	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Toluene	3 04E-04	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Total 2,3,7,8-TCDD TEQ	NC	--	NC	--	NC	3 05E-06	NC	4 74E-08	NC	7.69E-07	NC	--	NC	NC	--	NC
Total PCBs	5 11E+01	--	NC	--	NC	--	NC	--	NC	5.88E-03	5.01E-02	--	NC	5.01E-02	--	NC
Trichloroethene	3 81E-03	--	NC	1.80E-01	1.14E-04	--	NC	--	NC	--	NC	--	NC	1.14E-04	--	NC
Vanadium	5 78E-04	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Vinyl chloride	3.83E-03	9 70E-01	6.20E-04	2.40E-01	1.53E-04	--	NC	--	NC	--	NC	--	NC	7.73E-04	--	NC
Zinc	1.84E-05	--	NC	3.30E+01	1.01E-04	--	NC	--	NC	--	NC	--	NC	1.01E-04	--	NC
	Total HI:		1.08E-02		6.36E-03		4.71E-03		NC		6.40E-02		1.98E-04	8.80E-02		9.94E-02

Notes:
-- Not a constituent of potential concern in this area/medium
EPC - Exposure Point Concentration
HI - Hazard Index
HQ - Hazard Quotient.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium
(a) - HQ divided by the number of wells in this area

P-56

SAUGET AREA 1 - EE/CA AND RI/FS
RME

Receptors Evaluated:	
Receptor:	RME Construction Worker

ASSUMPTIONS FOR CONSTRUCTION WORKER - RME INHALATION OF TRENCH AIR		**Assumed Value**	**Units**	**Calculated Value**
Inhalation Rate	RME Construction Worker	2.5	(m^3 air/hour)	
Body Weight	RME Construction Worker	70	(kg)	
Exposure Time	RME Construction Worker	8	(hrs/day) =	8.00E+00
Exposure Frequency	RME Construction Worker	40	(days)/365 (days) =	1.10E-01
Exposure Duration (cancer)	RME Construction Worker	1	(yrs)/70(yrs) =	1.43E-02
Exposure Duration (noncancer)	RME Construction Worker	1	(yrs)/1(yrs) =	1.00E+00
Lifetime		70	(years)	

P–57

SAUGET AREA 1 - EE/CA AND RI/FS
RME

CARCINOGENIC ASSESSMENT
INHALATION OF
TRENCH AIR
CONSTRUCTION WORKER - RME

Constituent	Unit Concentration In Air (mg/m^3 air)	Inhalation Absorption Adjustment Factor	Inhalation Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	ADDinh RME Construction Worker (mg/kg-day)	Lifetime Average Daily Dose - Inh. (mg/kg-day)	Excess Lifetime Cancer Risk - Inhalation
1,1,2,2-Tetrachloroethane	1.00E+00	1	2.03E-01	4.47E-04	4.47E-04	9.08E-05
4-Methyl-2-pentanone	1.00E+00	NA	NA	NA	NA	NC
Benzene	1.00E+00	1	7.70E-03	4.47E-04	4.47E-04	3.44E-06
Chlorobenzene	1.00E+00	NA	NA	NA	NA	NC
Chloroform	1.00E+00	0.66	8.05E-02	2.95E-04	2.95E-04	2.38E-05
Ethylbenzene	1.00E+00	NA	NA	NA	NA	NC
Naphthalene	1.00E+00	NA	NA	NA	NA	NC
Tetrachloroethene	1.00E+00	1	2.00E-03	4.47E-04	4.47E-04	8.95E-07
Toluene	1.00E+00	NA	NA	NA	NA	NC
Trichloroethene	1.00E+00	1	6.00E-03	4.47E-04	4.47E-04	2.68E-06
Vinyl chloride	1.00E+00	1	1.54E-02	4.47E-04	4.47E-04	6.89E-06

TABLE
POTENTIAL CARCINOGENIC RISK
CONSTRUCTION WORKER - RME
TRENCH AIR

Constituent	Reference Risk (per mg/m3)	Fill Area G					Fill Area H				
		EE-05		EEG-107			EE-01		EE-02		
		EPC (mg/m3)	Risk (a)	EPC (mg/m3)	Risk (a)	Total	EPC (mg/m3)	Risk (a)	EPC (mg/m3)	Risk (a)	Total
1,1,2,2-Tetrachloroethane	9.08E-05	--	NC	--	NC	NC	2.80E-04	1.27E-08	--	NC	1.27E-08
4-Methyl-2-pentanone	NC	--	NC	1.25E-01	NC	NC	--	NC	--	NC	NC
Benzene	3.44E-06	2.98E-03	5.13E-09	1.00E-01	1.73E-07	1.78E-07	4.06E-02	7.00E-08	6.09E-02	1.05E-07	1.75E-07
Chlorobenzene	NC	1.55E-02	NC	1.07E-01	NC	NC	3.00E-02	NC	1.09E-01	NC	NC
Chloroform	2.38E-05	--	NC	--	NC	NC	--	NC	1.16E-02	1.38E-07	1.38E-07
Ethylbenzene	NC	--	NC	--	NC	NC	4.19E-02	NC	--	NC	NC
Naphthalene	NC	8.51E-03	NC	4.58E-02	NC	NC	5.02E-02	NC	4.26E-03	NC	NC
Tetrachloroethene	8.95E-07	--	NC	4.10E-03	1.83E-09	1.83E-09	--	NC	--	NC	NC
Toluene	NC	--	NC	2.24E-01	NC	NC	--	NC	--	NC	NC
Trichloroethene	2.68E-06	--	NC	2.62E-02	3.51E-08	3.51E-08	--	NC	6.48E-03	8.69E-09	8.69E-09
Vinyl chloride	6.89E-06	--	NC	1.30E-03	4.46E-09	4.46E-09	--	NC	--	NC	NC
Total:			5.13E-09		2.14E-07	2.19E-07		8.27E-08		2.52E-07	3.35E-07

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
(a) - Risk divided by number of wells in this area.

P-59

TABLE
POTENTIAL CARCINOGENIC RISK
CONSTRUCTION WORKER - RME
TRENCH AIR

Constituent	Reference Risk (per mg/m3)	Fill Area I									L	
		AA-I-S1		AA-I-S2		EE-12		EE-14			EEG-109	
		EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	Total	EPC (mg/m3)	Risk
1,1,2,2-Tetrachloroethane	9.08E-05	--	NC	--	NC	--	NC	--	NC	NC	--	NC
4-Methyl-2-pentanone	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Benzene	3.44E-06	1.68E-02	1.45E-08	3.25E-03	2.80E-09	1.84E-02	1.59E-08	2.03E-02	1.75E-08	5.06E-08	1.19E-03	4.10E-09
Chlorobenzene	NC	2.17E-01	NC	7.99E-02	NC	3.50E-02	NC	9.49E-02	NC	NC	--	NC
Chloroform	2.38E-05	--	NC	--	NC	--	NC	--	NC	NC	2.08E-03	4.95E-08
Ethylbenzene	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Naphthalene	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Tetrachloroethene	8.95E-07	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Toluene	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Trichloroethene	2.68E-06	--	NC	2.35E-02	1.58E-08	--	NC	--	NC	1.58E-08	--	NC
Vinyl chloride	6.89E-06	3.07E-02	5.28E-08	7.59E-03	1.31E-08	--	NC	--	NC	6.59E-08	--	NC
Total:			**6.73E-08**		**3.17E-08**		**1.59E-08**		**1.75E-08**	**1.32E-07**		**5.36E-08**

Notes:
-- Not a constituent of potential concern in this area/n
EPC - Exposure Point Concentration.
NC - Not Calculated, no dose-response value or not a
(a) - Risk divided by number of wells in this area.

P-60

SAUGET AREA 1 - EE/CA AND RI/FS
RME
NONCARCINOGENIC ASSESSMENT
INHALATION OF
TRENCH AIR
CONSTRUCTION WORKER - RME

Constituent	Unit Concentration In Air (mg/m³ air)	Inhalation Absorption Adjustment Factor	Inhalation Reference Dose (mg/kg-day)	ADDinh RME Construction Worker (mg/kg-day)	Chronic Average Daily Dose-Inh (mg/kg-day)	Hazard Index - Inhalation
1,1,2,2-Tetrachloroethane	1.00E+00	NA	NA	NA	NA	NC
4-Methyl-2-pentanone	1.00E+00	1	2.29E-02	3.13E-02	3.13E-02	1.37E+00
Benzene	1.00E+00	1	1.70E-03	3.13E-02	3.13E-02	1.84E+01
Chlorobenzene	1.00E+00	1	5.71E-03	3.13E-02	3.13E-02	5.48E+00
Chloroform	1.00E+00	1	8.60E-05	3.13E-02	3.13E-02	3.64E+02
Ethylbenzene	1.00E+00	1	2.86E-01	3.13E-02	3.13E-02	1.09E-01
Naphthalene	1.00E+00	1	8.57E-04	3.13E-02	3.13E-02	3.65E+01
Tetrachloroethene	1.00E+00	1	1.14E-01	3.13E-02	3.13E-02	2.75E-01
Toluene	1.00E+00	1	1.14E-01	3.13E-02	3.13E-02	2.75E-01
Trichloroethene	1.00E+00	NA	NA	NA	NA	NC
Vinyl chloride	1.00E+00	1	2.86E-02	3.13E-02	3.13E-02	1.10E+00

P-61

TABLE
POTENTIAL HAZARD QUOTIENT
CONSTRUCTION WORKER - RME
TRENCH AIR

Constituent	Reference HQ (per mg/m3)	Fill Area G					Fill Area H				
		EE-05		EEG-107		Total	EE-01		EE-02		Total
		EPC (mg/m3)	HQ (a)	EPC (mg/m3)	HQ (a)		EPC (mg/m3)	HQ (a)	EPC (mg/m3)	HQ (a)	
1,1,2,2-Tetrachloroethane	NC	--	NC	--	NC	NC	2.80E-04	NC	--	NC	NC
4-Methyl-2-pentanone	1.37E+00	--	NC	1.25E-01	8.55E-02	8.55E-02	--	NC	--	NC	NC
Benzene	1.84E+01	2.98E-03	2.74E-02	1.00E-01	9.23E-01	9.50E-01	4.06E-02	3.74E-01	6.09E-02	5.61E-01	9.35E-01
Chlorobenzene	5.48E+00	1.55E-02	4.24E-02	1.07E-01	2.94E-01	3.37E-01	3.00E-02	8.21E-02	1.09E-01	2.98E-01	3.80E-01
Chloroform	3.64E+02	--	NC	--	NC	NC	--	NC	1.16E-02	2.12E+00	2.12E+00
Ethylbenzene	1.09E-01	--	NC	--	NC	NC	4.19E-02	2.29E-03	--	NC	2.29E-03
Naphthalene	3.65E+01	8.51E-03	1.56E-01	4.58E-02	8.37E-01	9.93E-01	5.02E-02	9.17E-01	4.26E-03	7.78E-02	9.95E-01
Tetrachloroethene	2.75E-01	--	NC	4.10E-03	5.63E-04	5.63E-04	--	NC	--	NC	NC
Toluene	2.75E-01	--	NC	2.24E-01	3.08E-02	3.08E-02	--	NC	--	NC	NC
Trichloroethene	NC	--	NC	2.62E-02	NC	NC	--	NC	6.48E-03	NC	NC
Vinyl chloride	1.10E+00	--	NC	1.30E-03	7.10E-04	7.10E-04	--	NC	--	NC	NC
	Total HI:		**2.25E-01**		**2.17E+00**	**2.40E+00**		**1.38E+00**		**3.06E+00**	**4.43E+00**

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
(a) - HQ divided by number of wells in this area.

TABLE
POTENTIAL HAZARD QUOTIENT
CONSTRUCTION WORKER - RME
TRENCH AIR

Constituent	Reference HQ (per mg/m3)	Fill Area I									Fill Area L	
		AA-I-S1		AA-I-S2		EE-12		EE-14			EEG-109	
		EPC (mg/m3)	HQ	EPC (mg/m3)	HQ	EPC (mg/m3)	HQ	EPC (mg/m3)	HQ	Total	EPC (mg/m3)	HQ
1,1,2,2-Tetrachloroethane	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
4-Methyl-2-pentanone	1.37E+00	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Benzene	1.84E+01	1.68E-02	7.73E-02	3.25E-03	1.50E-02	1.84E-02	8.48E-02	2.03E-02	9.35E-02	2.71E-01	1.19E-03	2.19E-02
Chlorobenzene	5.48E+00	2.17E-01	2.98E-01	7.99E-02	1.10E-01	3.50E-02	4.79E-02	9.49E-02	1.30E-01	5.85E-01	--	NC
Chloroform	3.64E+02	--	NC	--	NC	--	NC	--	NC	NC	2.08E-03	7.58E-01
Ethylbenzene	1.09E-01	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Naphthalene	3.65E+01	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Tetrachloroethene	2.75E-01	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Toluene	2.75E-01	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Trichloroethene	NC	--	NC	2.35E-02	NC	--	NC	--	NC	NC	--	NC
Vinyl chloride	1.10E+00	3.07E-02	8.40E-03	7.59E-03	2.08E-03	--	NC	--	NC	1.05E-02	--	NC
	Total HI:		3.84E-01		1.27E-01		1.33E-01		2.24E-01	8.66E-01		7.80E-01

Notes:
-- Not a constituent of potential concern in this area/m
EPC - Exposure Point Concentration
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated, no dose-response value or not a
(a) - HQ divided by number of wells in this area.

SAUGET AREA 1 - EE/CA AND RI/FS
MLE

Receptors Evaluated	
Receptor 3:	MLE Construction Worker

ASSUMPTIONS FOR CONSTRUCTION WORKER MLE INCIDENTIAL INGESTION AND DERMAL CONTACT SOIL

		Assumed Value	Units	Calculated Value
Soil Ingestion Rate	MLE Construction Worker	64	(mg soil/day)	
Soil on Skin	MLE Construction Worker	0.19	(mg/cm^2)	
Skin Exposed	MLE Construction Worker	3339	(cm^2)	
Body Weight	MLE Construction Worker	70	(kg)	
Exposure Frequency	MLE Construction Worker	20	(days)/365(days) =	5.48E-02
Exposure Duration (cancer)	MLE Construction Worker	1	(years)/70(years) =	1.43E-02
Exposure Duration (noncancer)	MLE Construction Worker	1	(yrs)/1(yrs) =	1.00E+00
Lifetime		70	(years)	
Unit Conversion Factor		1.00E-06	(kg/mg)	

22-Dec-00

SAUGET AREA 1 - EE/CA AND RI/FS
MLE
POTENTIAL CARCINOGENIC RISK
INCIDENTIAL INGESTION AND DERMAL CONTACT
SOIL
CONSTRUCTION WORKER MLE

Constituent	Unit Concentration in Soil (mg/kg soil)	Oral - Soil Absorption Adjustment Factor	Dermal - Soil Absorption Adjustment Factor	Oral Cancer Slope Factor (mg/kg-day)⁻¹	ADDing MLE Construction Worker (mg/kg-day)	Lifetime Average Daily Dose-Ing. (mg/kg-day)	ADDder MLE Construction Worker (mg/kg-day)	Lifetime Average Daily Dose-Der. (mg/kg-day)	Excess Lifetime Cancer Risk - Ingestion	Excess Lifetime Cancer Risk - Dermal Contact	Total Excess Lifetime Cancer Risk
Arsenic	1.00E+00	0.3	0.001	1.50E+00	2.15E-10	2.15E-10	7.09E-12	7.09E-12	3.22E-10	1.06E-11	3.33E-10
Benzo(a)anthracene	1.00E+00	0.29	0.02	7.30E-01	2.08E-10	2.08E-10	1.42E-10	1.42E-10	1.52E-10	1.04E-10	2.55E-10
Benzo(a)pyrene	1.00E+00	0.29	0.02	7.30E+00	2.08E-10	2.08E-10	1.42E-10	1.42E-10	1.52E-09	1.04E-09	2.55E-09
Benzo(b)fluoranthene	1.00E+00	0.29	0.02	7.30E-01	2.08E-10	2.08E-10	1.42E-10	1.42E-10	1.52E-10	1.04E-10	2.55E-10
Copper	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Dibenzo(a,h)anthracene	1.00E+00	0.29	0.02	7.30E+00	2.08E-10	2.08E-10	1.42E-10	1.42E-10	1.52E-09	1.04E-09	2.55E-09
Dieldrin	1.00E+00	1	0.01	1.60E+01	7.16E-10	7.16E-10	7.09E-11	7.09E-11	1.15E-08	1.14E-09	1.26E-08
Indeno(1,2,3-cd)pyrene	1.00E+00	0.29	0.02	7.30E-01	2.08E-10	2.08E-10	1.42E-10	1.42E-10	1.52E-10	1.04E-10	2.55E-10
Total 2,3,7,8-TCDD TEQ	1.00E+00	0.5	0.05	1.50E+05	3.58E-10	3.58E-10	3.55E-10	3.55E-10	5.37E-05	5.32E-05	1.07E-04
Total PCBs	1.00E+00	0.83	0.04	2.00E+00	5.94E-10	5.94E-10	2.84E-10	2.84E-10	1.19E-09	5.68E-10	1.76E-09

P-65

TABLE
POTENTIAL CARCINOGENIC RISK - MLE
INCIDENTIAL INGESTION AND DERMAL CONTACT
SOIL
CONSTRUCTION WORKER MLE
SAUGET AREA 1 - EE/CA AND RI/FS

Constituent	Reference Risk (per mg/kg)	Transect 3 EPC (mg/kg)	Transect 3 Risk	Transect 4 (a) EPC (mg/kg)	Transect 4 (a) Risk	Transect 6 (a) EPC (mg/kg)	Transect 6 (a) Risk	Transect 7 EPC (mg/kg)	Transect 7 Risk	Fill Area H EPC (mg/kg)	Fill Area H Risk	Fill Area I EPC (mg/kg)	Fill Area I Risk	Fill Area L EPC (mg/kg)	Fill Area L Risk
Arsenic	3.33E-10	--	NC	--	NC	--	NC	9.99E+00	3.32E-09	2.28E+01	7.59E-09	--	NC	3.33E+01	1.11E-08
Benzo(a)anthracene	2.55E-10	--	NC	1.28E+00	3.27E-10	--	NC	--	NC	--	NC	--	NC	--	NC
Benzo(a)pyrene	2.55E-09	1.37E-01	3.49E-10	6.09E-01	1.55E-09	5.04E-01	1.29E-09	3.74E-01	9.54E-10	--	NC	6.29E-01	1.60E-09	2.30E+00	5.87E-09
Benzo(b)fluoranthene	2.55E-10	--	NC	1.07E+00	2.73E-10	--	NC	--	NC	--	NC	--	NC	--	NC
Copper	NC	--	NC	--	NC	--	NC	--	NC	--	NC	6.66E+03	NC	--	NC
Dibenzo(a,h)anthracene	2.55E-09	--	NC	2.39E-01	6.10E-10	--	NC	--	NC	--	NC	--	NC	4.55E-01	1.16E-09
Dieldrin	1.26E-08	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Indeno(1,2,3-cd)pyrene	2.55E-10	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Total 2,3,7,8-TCDD TEQ	1.07E-04	--	NC	--	NC	--	NC	--	NC	5.33E-04	5.70E-08	3.34E-03	3.57E-07	--	NC
Total PCBs	1.76E-09	--	NC	--	NC	--	NC	--	NC	6.60E-01	1.16E-09	3.13E+01	5.49E-08	4.90E-01	8.60E-10
	Total:		3.49E-10		2.76E-09		1.29E-09		4.28E-09		6.57E-08		4.14E-07		1.90E-08

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
(a) - Higher of surface soil and subsurface soil EPC used.

P-66

SAUGET AREA 1 - EE/CA AND RI/FS
MLE
NONCARCINOGENIC HAZARD INDEX
INCIDENTIAL INGESTION AND DERMAL CONTACT
SOIL
CONSTRUCTION WORKER MLE

Constituent	Unit Concentration in Soil (mg/kg-soil)	Oral - Soil Absorption Adjustment Factor	Dermal - Soil Absorption Adjustment Factor	Oral Reference Dose (mg/kg-day)	ADDing LE Construction Worker (mg/kg-day)	Chronic Average Daily Dose-Ing. (mg/kg-day)	ADDder LE Construction Worker (mg/kg-day)	Chronic Average Daily Dose-Der. (mg/kg-day)	Hazard Index - Ingestion	Hazard Index - Dermal Contact	Total Hazard Index
Arsenic	1.00E+00	0.3	0.001	3.00E-04	1.50E-08	1.50E-08	4.97E-10	4.97E-10	5.01E-05	1.66E-06	5.18E-05
Benzo(a)anthracene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Benzo(a)pyrene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Benzo(b)fluoranthene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Copper	1.00E+00	1	0.002	3.70E-02	5.01E-08	5.01E-08	9.93E-10	9.93E-10	1.35E-06	2.68E-08	1.38E-06
Dibenzo(a,h)anthracene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Dieldrin	1.00E+00	1	0.01	5.00E-05	5.01E-08	5.01E-08	4.97E-09	4.97E-09	1.00E-03	9.93E-05	1.10E-03
Indeno(1,2,3-cd)pyrene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Total 2,3,7,8-TCDD TEQ	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Total PCBs	1.00E+00	0.83	0.04	2.00E-05	4.16E-08	4.16E-08	1.99E-08	1.99E-08	2.08E-03	9.93E-04	3.07E-03

TABLE
POTENTIAL HAZARD INDEX - MLE
INCIDENTIAL INGESTION AND DERMAL CONTACT
SOIL
CONSTRUCTION WORKER MLE
SAUGET AREA 1 - EE/CA AND RI/FS

Constituent	Reference HI (per mg/kg)	Transect 3 EPC (mg/kg)	Transect 3 HQ	Transect 4 (a) EPC (mg/kg)	Transect 4 (a) HQ	Transect 6 (a) EPC (mg/kg)	Transect 6 (a) HQ	Transect 7 EPC (mg/kg)	Transect 7 HQ	Fill Area H EPC (mg/kg)	Fill Area H HQ	Fill Area I EPC (mg/kg)	Fill Area I HQ	Fill Area L EPC (mg/kg)	Fill Area L HQ
Arsenic	5.18E-05	--	NC	--	NC	--	NC	9.99E+00	5.17E-04	2.28E+01	1.18E-03	--	NC	3.33E+01	1.72E-03
Benzo(a)anthracene	NC	--	NC	1.28E+00	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Benzo(a)pyrene	NC	1.37E-01	NC	6.09E-01	NC	5.04E-01	NC	3.74E-01	NC	--	NC	6.29E-01	NC	2.30E+00	NC
Benzo(b)fluoranthene	NC	--	NC	1.07E+00	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Copper	1.38E-06	--	NC	--	NC	--	NC	--	NC	--	NC	6.66E+03	9.20E-03	--	NC
Dibenzo(a,h)anthracene	NC	--	NC	2.39E-01	NC	--	NC	--	NC	--	NC	--	NC	4.55E-01	NC
Dieldrin	1.10E-03	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Indeno(1,2,3-cd)pyrene	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Total 2,3,7,8-TCDD TEQ	NC	--	NC	--	NC	--	NC	--	NC	5.33E-04	NC	3.34E-03	NC	--	NC
Total PCBs	3.07E-03	--	NC	--	NC	--	NC	--	NC	6.60E-01	2.03E-03	3.13E+01	9.62E-02	4.90E-01	1.51E-03
	Total HI:		NC		NC		NC		5.17E-04		3.21E-03		1.05E-01		3.23E-03

Notes:
-- Not a constituent of concern in this area/medium.
EPC - Exposure Point Concentration.
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
(a) - Higher of surface soil and subsurface soil EPC used.

P-68

SAUGET AREA 1 - EE/CA AND RI/FS
MLE

Receptors Evaluated:	
Receptor 1:	MLE Construction Worker

ASSUMPTIONS FOR CONSTRUCTION WORKER - MLE INHALATION OF OUTDOOR AIR PARTICULATES		Assumed Value	Units	Calculated Value
Inhalation Rate	MLE Construction Worker	1.5	(m^3 air/hour)	
Body Weight	MLE Construction Worker	70	(kg)	
Exposure Time	MLE Construction Worker	8	(hrs/day) =	8.00E+00
Exposure Frequency	MLE Construction Worker	20	(days)/365 (days) =	5.48E-02
Exposure Duration (cancer)	MLE Construction Worker	1	(yrs)/70(yrs) =	1.43E-02
Exposure Duration (noncancer)	MLE Construction Worker	1	(yrs)/1(yrs) =	1.00E+00
Lifetime		70	(years)	

P-69

SAUGET AREA 1 - EE/CA AND RI/FS
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR PARTICULATES
CONSTRUCTION WORKER - MLE

Constituent	Unit Concentration In Air (mg/m^3 air)	Inhalation Absorption Adjustment Factor	Inhalation Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	ADDInh LE Construction Worker (mg/kg-day)	Lifetime Average Daily Dose - Inh. (mg/kg-day)	Excess Lifetime Cancer Risk - Inhalation
Arsenic	1.00E+00	1	1.50E+01	1.34E-04	1.34E-04	2.01E-03
Benzo(a)anthracene	1.00E+00	1	3.10E-01	1.34E-04	1.34E-04	4.16E-05
Benzo(a)pyrene	1.00E+00	1	3.10E+00	1.34E-04	1.34E-04	4.16E-04
Benzo(b)fluoranthene	1.00E+00	1	3.10E-01	1.34E-04	1.34E-04	4.16E-05
Copper	1.00E+00	NA	NA	NA	NA	NC
Dibenzo(a,h)anthracene	1.00E+00	1	3.10E+00	1.34E-04	1.34E-04	4.16E-04
Dieldrin	1.00E+00	1	1.61E+01	1.34E-04	1.34E-04	2.16E-03
Indeno(1,2,3-cd)pyrene	1.00E+00	1	3.10E-01	1.34E-04	1.34E-04	4.16E-05
Total 2,3,7,8-TCDD TEQ	1.00E+00	1	1.50E+05	1.34E-04	1.34E-04	2.01E+01
Total PCBs	1.00E+00	1	2.00E+00	1.34E-04	1.34E-04	2.68E-04

TABLE
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR PARTICULATES
CONSTRUCTION WORKER - MLE

Constituent	Reference Risk (per mg/m3)	Transect 3		Transect 4 (a)		Transect 6 (a)		Transect 7		Fill Area H		Fill Area I		Fill Area L	
		EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk
Arsenic	2.01E-03	--	NC	--	NC	--	NC	5.99E-07	1.21E-09	1.37E-06	2.75E-09	--	NC	2.00E-06	4.02E-09
Benzo(a)anthracene	4.16E-05	--	NC	7.68E-08	3.19E-12	--	NC	--	NC	--	NC	--	NC	--	NC
Benzo(a)pyrene	4.16E-04	8.22E-09	3.42E-12	3.65E-08	1.52E-11	3.02E-08	1.26E-11	2.24E-08	9.33E-12	--	NC	3.77E-08	1.57E-11	1.38E-07	5.74E-11
Benzo(b)fluoranthene	4.16E-05	--	NC	6.42E-08	2.67E-12	--	NC	--	NC	--	NC	--	NC	--	NC
Copper	NC	--	NC	--	NC	--	NC	--	NC	--	NC	4.00E-04	NC	--	NC
Dibenzo(a,h)anthracene	4.16E-04	--	NC	1.43E-08	5.97E-12	--	NC	--	NC	--	NC	--	NC	2.73E-08	1.14E-11
Dieldrin	2.16E-03	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Indeno(1,2,3-cd)pyrene	4.16E-05	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC
Total 2,3,7,8-TCDD TEQ	2.01E+01	--	NC	--	NC	--	NC	--	NC	3.20E-11	6.44E-10	2.00E-10	4.03E-09	--	NC
Total PCBs	2.68E-04	--	NC	--	NC	--	NC	--	NC	3.96E-08	1.06E-11	1.88E-06	5.04E-10	2.94E-08	7.89E-12
	Total:		3.42E-12		2.70E-11		1.26E-11		1.22E-09		3.41E-09		4.55E-09		4.10E-09

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
(a) - Higher of the surface soil and subsurface soil EPC used.

P-71

SAUGET AREA 1 - EE/CA AND RI/FS
NONCARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR PARTICULATES
CONSTRUCTION WORKER - MLE

Constituent	Unit Concentration In Air (mg/m³ air)	Inhalation Absorption Adjustment Factor	Inhalation Reference Dose (mg/kg-day)	ADDinh Construction Worker (mg/kg-day)	Chronic Average Daily Dose-inh (mg/kg-day)	Hazard Index - Inhalation
Arsenic	1.00E+00	NA	NA	NA	NA	NC
Benzo(a)anthracene	1.00E+00	NA	NA	NA	NA	NC
Benzo(a)pyrene	1.00E+00	NA	NA	NA	NA	NC
Benzo(b)fluoranthene	1.00E+00	NA	NA	NA	NA	NC
Copper	1.00E+00	NA	NA	NA	NA	NC
Dibenzo(a,h)anthracene	1.00E+00	NA	NA	NA	NA	NC
Dieldrin	1.00E+00	NA	NA	NA	NA	NC
Indeno(1,2,3-cd)pyrene	1.00E+00	NA	NA	NA	NA	NC
Total 2,3,7,8-TCDD TEQ	1.00E+00	NA	NA	NA	NA	NC
Total PCBs	1.00E+00	NA	NA	NA	NA	NC

P-72

SAUGET AREA 1 - EE/CA AND RI/FS
MLE

Receptors Evaluated:	
Receptor 3:	MLE Construction Worker

ASSUMPTIONS FOR CONSTRUCTION WORKER-MLE
INCIDENTAL INGESTION AND DERMAL CONTACT
GROUNDWATER

		Assumed Value	Units	Calculated Value
Water Ingestion Rate	MLE Construction Worker	0.005	(l/day)	
Skin Exposed	MLE Construction Worker	3339	(cm^2)	
Body Weight	MLE Construction Worker	70	(kg)	
Exposure Time (dermal route only)	MLE Construction Worker	1	(hr/day)	
Exposure Frequency	MLE Construction Worker	5	(days)/365 (days) =	1.37E-02
Exposure Duration (cancer)	MLE Construction Worker	1	(yrs)/ 70(yrs) =	1.43E-02
Exposure Duration (noncancer)	MLE Construction Worker	1	(yrs)/ 1(yrs) =	1.00E+00
Lifetime		70	(years)	
Unit Conversion Factor (dermal route only)		0.001	(l/cm^3)	

22-Dec-00

P-73

SAUGET AREA 1 - EE/CA AND RI/FS
MLE
CARCINOGENIC ASSESSMENT
INCIDENTAL INGESTION AND DERMAL CONTACT
GROUNDWATER
CONSTRUCTION WORKER - MLE

Constituent	Unit Concentration In Groundwater (mg/l)	Oral - Water Absorption Adjustment Factor	Dermal - Water Absorption Adjustment Factor	Dermal PeMLEability Constant (cm/hr)	Oral Cancer Slope Factor (mg/kg-day)⁻¹	ADDing Construction Worker (mg/kg-day)	Lifetime Average Daily Dose-Ing. (mg/kg-day)	ADDder Construction Worker (mg/kg-day)	Lifetime Average Daily Dose-Der. (mg/kg-day)	Excess Lifetime Cancer Risk - Ingestion	Excess Lifetime Cancer Risk - Dermal Contact	Total Excess Lifetime Cancer Risk
1,1,2,2-Tetrachloroethane	1.00E+00	1	1	9.00E-03	2.00E-01	1.40E-08	1.40E-08	8.40E-08	8.40E-08	2.80E-09	1.68E-08	1.96E-08
1,4-Dichlorobenzene	1.00E+00	1	1	6.20E-02	2.40E-02	1.40E-08	1.40E-08	5.79E-07	5.79E-07	3.35E-10	1.39E-08	1.42E-08
2,4,5-TP (Silvex)	1.00E+00	NA	NA	2.33E-03	NA	NA	NA	NA	NA	NA	NA	NC
2,4,6-Trichlorophenol	1.00E+00	1	1	5.00E-02	1.10E-02	1.40E-08	1.40E-08	4.67E-07	4.67E-07	1.54E-10	5.13E-09	5.29E-09
2,4-Dichlorophenol	1.00E+00	NA	NA	2.30E-02	NA	NA	NA	NA	NA	NA	NA	NC
2-Chlorophenol	1.00E+00	NA	NA	1.10E-02	NA	NA	NA	NA	NA	NA	NA	NC
2-Nitroaniline	1.00E+00	NA	NA	5.45E-03	NA	NA	NA	NA	NA	NA	NA	NC
3-Methylphenol/4-Methylphenol	1.00E+00	NA	NA	1.00E-02	NA	NA	NA	NA	NA	NA	NA	NC
4,4-DDE	1.00E+00	1	1	2.40E-01	3.40E-01	1.40E-08	1.40E-08	2.24E-06	2.24E-06	4.75E-09	7.62E-07	7.66E-07
4-Chloroaniline	1.00E+00	NA	NA	6.33E-03	NA	NA	NA	NA	NA	NA	NA	NC
4-Methyl-2-pentanone	1.00E+00	NA	NA	2.77E-03	NA	NA	NA	NA	NA	NA	NA	NC
4-Nitroaniline	1.00E+00	NA	NA	2.66E-03	NA	NA	NA	NA	NA	NA	NA	NC
alpha-BHC	1.00E+00	1	1	1.63E-02	6.30E+00	1.40E-08	1.40E-08	1.52E-07	1.52E-07	8.81E-08	9.59E-07	1.05E-06
Antimony	1.00E+00	NA	NA	1.60E-04	NA	NA	NA	NA	NA	NA	NA	NC
Arsenic	1.00E+00	1	1	1.60E-04	1.50E+00	1.40E-08	1.40E-08	1.49E-09	1.49E-09	2.10E-08	2.24E-09	2.32E-08
Benzene	1.00E+00	1	2.13	2.10E-02	1.50E-02	1.40E-08	1.40E-08	4.18E-07	4.18E-07	2.10E-10	6.26E-09	6.47E-09
Benzo(k)fluoranthene	1.00E+00	1	1	1.20E+00	7.30E-02	1.40E-08	1.40E-08	1.12E-05	1.12E-05	1.02E-09	8.18E-07	8.19E-07
beta-BHC	1.00E+00	1	1	1.60E-02	1.80E+00	1.40E-08	1.40E-08	1.49E-07	1.49E-07	2.52E-08	2.69E-07	2.94E-07
Cadmium	1.00E+00	NA	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NC
Carbazole	1.00E+00	1	1	7.97E-02	2.00E-02	1.40E-08	1.40E-08	7.44E-07	7.44E-07	2.80E-10	1.49E-08	1.52E-08
Chlorobenzene	1.00E+00	NA	NA	4.10E-02	NA	NA	NA	NA	NA	NA	NA	NC
Chloroform	1.00E+00	1	1	8.90E-03	6.10E-03	1.40E-08	1.40E-08	8.31E-08	8.31E-08	8.53E-11	5.07E-10	5.92E-10
Cis/Trans-1,2-Dichloroethene	1.00E+00	NA	NA	1.00E-02	NA	NA	NA	NA	NA	NA	NA	NC
delta-BHC	1.00E+00	NA	NA	1.60E-02	NA	NA	NA	NA	NA	NA	NA	NC
Ethylbenzene	1.00E+00	NA	NA	7.40E-02	NA	NA	NA	NA	NA	NA	NA	NC
Heptachlor	1.00E+00	1	1	1.10E-02	4.50E+00	1.40E-08	1.40E-08	1.03E-07	1.03E-07	6.29E-08	4.62E-07	5.25E-07
Heptachlor epoxide	1.00E+00	1	1	1.10E-02	9.10E+00	1.40E-08	1.40E-08	1.03E-07	1.03E-07	1.27E-07	9.34E-07	1.06E-06
Molybdenum	1.00E+00	NA	NA	1.60E-04	NA	NA	NA	NA	NA	NA	NA	NC
Naphthalene	1.00E+00	NA	NA	6.90E-02	NA	NA	NA	NA	NA	NA	NA	NC
Nickel	1.00E+00	NA	NA	5.45E-05	NA	NA	NA	NA	NA	NA	NA	NC
Nitrobenzene	1.00E+00	NA	NA	6.96E-03	NA	NA	NA	NA	NA	NA	NA	NC
Pentachlorophenol	1.00E+00	1	1	6.50E-01	1.20E-01	1.40E-08	1.40E-08	6.07E-06	6.07E-06	1.68E-09	7.28E-07	7.30E-07
Phenol	1.00E+00	NA	NA	5.50E-03	NA	NA	NA	NA	NA	NA	NA	NC
Tetrachloroethene	1.00E+00	1	1	4.80E-02	5.20E-02	1.40E-08	1.40E-08	4.48E-07	4.48E-07	7.27E-10	2.33E-08	2.40E-08
Toluene	1.00E+00	NA	NA	4.50E-02	NA	NA	NA	NA	NA	NA	NA	NC
Total 2,3,7,8-TCDD TEQ	1.00E+00	1	1.8	1.40E+00	1.50E+05	1.40E-08	1.40E-08	2.35E-05	2.35E-05	2.10E-03	3.53E+00	3.53E+00
Total PCBs	1.00E+00	1	1.1	7.10E-01	2.00E+00	1.40E-08	1.40E-08	7.29E-06	7.29E-06	2.80E-08	1.46E-05	1.46E-05
Trichloroethene	1.00E+00	1	1	1.60E-02	1.10E-02	1.40E-08	1.40E-08	1.49E-07	1.49E-07	1.54E-10	1.64E-09	1.80E-09
Vanadium	1.00E+00	NA	NA	1.60E-04	NA	NA	NA	NA	NA	NA	NA	NC
Vinyl chloride	1.00E+00	1	1	7.30E-03	7.20E-01	1.40E-08	1.40E-08	6.81E-08	6.81E-08	1.01E-08	4.91E-08	5.91E-08
Zinc	1.00E+00	NA	NA	6.00E-04	NA	NA	NA	NA	NA	NA	NA	NC

TABLE
POTENTIAL CARCINOGENIC RISK - MLE
INCIDENTAL INGESTION AND DERMAL CONTACT
GROUNDWATER
CONSTRUCTION WORKER- MLE

Constituent	Reference Risk (per mg/L)	Fill Area G							Fill Area H						
		EE-05		EEG-106		EEG-107			EE-01		EE-02		EE-03		
		EPC (mg/L)	Risk (a)	EPC (mg/L)	Risk (a)	EPC (mg/L)	Risk (a)	Total	EPC (mg/L)	Risk (a)	EPC (mg/L)	Risk (a)	EPC (mg/L)	Risk (a)	Total
1,1,2,2-Tetrachloroethane	1.98E-08	--	NC	--	NC	--	NC	NC	1.20E-02	7.84E-11	--	NC	--	NC	7.84E-11
1,4-Dichlorobenzene	1.42E-08	--	NC	--	NC	8.50E-01	4.03E-09	4.03E-09	2.20E+00	1.04E-08	6.35E-01	3.01E-09	--	NC	1.34E-08
2,4,5-TP (Silvex)	NC	3 90E-01	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
2,4,6-Trichlorophenol	5 29E-09	--	NC	--	NC	--	NC	NC	2 70E-01	4 76E-10	4.65E-01	8.20E-10	--	NC	1.30E-09
2,4-Dichlorophenol	NC	--	NC	--	NC	3.60E+00	NC	NC	--	NC	3 70E-01	NC	--	NC	NC
2-Chlorophenol	NC	--	NC	--	NC	6 30E-01	NC	NC	--	NC	--	NC	--	NC	NC
2-Nitroaniline	NC	--	NC	--	NC	--	NC	NC	--	NC	1.35E-02	NC	--	NC	NC
3-Methylphenol/4-Methylphenol	NC	--	NC	--	NC	2 40E+00	NC	NC	--	NC	--	NC	--	NC	NC
4,4-DDE	7 66E-07	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
4-Chloroaniline	NC	1.60E+00	NC	--	NC	2.30E+01	NC	NC	1.80E+00	NC	7.75E-01	NC	--	NC	NC
4-Methyl-2-pentanone	NC	--	NC	--	NC	1.30E+00	NC	NC	--	NC	--	NC	--	NC	NC
4-Nitroaniline	NC	8 40E-03	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
alpha-BHC	1.05E-06	--	NC	8.30E-03	2.90E-09	6.00E-03	2.09E-09	4.99E-09	--	NC	4.95E-04	1.73E-10	--	NC	1.73E-10
Antimony	NC	--	NC	--	NC	--	NC	NC	--	NC	1.05E-01	NC	--	NC	NC
Arsenic	2.32E-08	--	NC	--	NC	--	NC	NC	--	NC	1 25E+00	9.67E-09	--	NC	9.67E-09
Benzene	6.47E-09	1 10E-01	2.37E-10	--	NC	3 70E+00	7.98E-09	8.22E-09	1.50E+00	3 24E-09	2 25E+00	4.85E-09	--	NC	8.09E-09
Benzo(k)fluoranthene	8 19E-07	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
beta-BHC	2 94E-07	--	NC	3 60E-04	3.53E-11	--	NC	3.53E-11	--	NC	--	NC	--	NC	NC
Cadmium	NC	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
Carbazole	1.52E-08	--	NC	--	NC	--	NC	NC	5.20E-03	2 63E-11	--	NC	--	NC	2.63E-11
Chlorobenzene	NC	6 20E-01	NC	--	NC	4.30E+00	NC	NC	1.20E+00	NC	4.35E+00	NC	--	NC	NC
Chloroform	5 92E-10	--	NC	--	NC	--	NC	NC	--	NC	4 25E-01	8 39E-11	--	NC	8 39E-11
Cis/Trans-1,2-Dichloroethene	NC	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
delta-BHC	NC	3 60E-04	NC	--	NC	1 70E-02	NC	NC	--	NC	--	NC	--	NC	NC
Ethylbenzene	NC	--	NC	--	NC	--	NC	NC	1.80E+00	NC	--	NC	--	NC	NC
Heptachlor	5 25E-07	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
Heptachlor epoxide	1.06E-06	--	NC	--	NC	--	NC	NC	--	NC	4.40E-03	1 56E-09	--	NC	1.56E-09
Molybdenum	NC	4 50E-01	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
Naphthalene	NC	3 90E-01	NC	--	NC	2.10E+00	NC	NC	2 30E+00	NC	1 95E-01	NC	--	NC	NC
Nickel	NC	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
Nitrobenzene	NC	--	NC	--	NC	--	NC	NC	--	NC	5.65E-02	NC	--	NC	NC
Pentachlorophenol	7.30E-07	--	NC	--	NC	1.01E+00	2 46E-07	2 46E-07	3.35E+00	8 15E-07	6 50E-01	1 58E-07	--	NC	9 73E-07
Phenol	NC	3 80E-01	NC	--	NC	1 40E+01	NC	NC	--	NC	3 15E-01	NC	--	NC	NC
Tetrachloroethene	2 40E-08	--	NC	--	NC	1.70E-01	1.36E-09	1.36E-09	--	NC	--	NC	--	NC	NC
Toluene	NC	--	NC	--	NC	8 50E+00	NC	NC	--	NC	--	NC	--	NC	NC
Total 2,3,7,8-TCDD TEQ	3 53E+00	1 78E-07	2.09E-07	--	NC	3 60E-06	4 24E-06	4.45E-06	4 57E-08	5 38E-08	--	NC	5.02E-08	5 91E-08	1.13E-07
Total PCBs	1 46E-05	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
Trichloroethene	1.80E-09	--	NC	--	NC	2.00E-01	1.20E-10	1 20E-10	--	NC	4.95E-02	2 96E-11	--	NC	2 96E-11
Vanadium	NC	--	NC	--	NC	3 30E-01	NC	NC	--	NC	--	NC	--	NC	NC
Vinyl chloride	5 91E-08	--	NC	--	NC	4.10E-02	8.08E-10	8 08E-10	--	NC	--	NC	--	NC	NC
Zinc	NC	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
	Total:		2.10E-07		2.93E-09		4.50E-06	4.71E-06		8.83E-07		1.78E-07		5.91E-08	1.12E-06

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium
(a) - Risks divided by the number of wells in this area

TABLE
POTENTIAL CARCINOGENIC RISK - MLE
INCIDENTAL INGESTION AND DERMAL CONTACT
GROUNDWATER
CONSTRUCTION WORKER- MLE

Constituent	Reference Risk (per mg/L)	Fill Area I: AA-I-S1 EPC (mg/L)	AA-I-S1 Risk (a)	AA-I-S2 EPC (mg/L)	AA-I-S2 Risk (a)	EE-12 EPC (mg/L)	EE-12 Risk (a)	EE-13 EPC (mg/L)	EE-13 Risk (a)	EE-14 EPC (mg/L)	EE-14 Risk (a)	EE-15 EPC (mg/L)	EE-15 Risk (a)	Total	Fill Area L: EE-109 EPC (mg/L)	EE-109 Risk (a)
1,1,2,2-Tetrachloroethane	1.96E-08	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
1,4-Dichlorobenzene	1.42E-08	2.21E+00	5.24E-09	2.15E+00	5.10E-09	--	NC	--	NC	1.40E+01	3.32E-08	4.30E-01	1.02E-09	4.45E-08	--	NC
2,4,5-TP (Silvex)	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
2,4,6-Trichlorophenol	5.29E-09	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
2,4-Dichlorophenol	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	2.60E-02	NC
2-Chlorophenol	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
2-Nitroaniline	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
3-Methylphenol/4-Methylphenol	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
4,4-DDE	7.66E-07	--	NC	--	NC	2.20E-03	2.81E-10	--	NC	--	NC	--	NC	2.81E-10	--	NC
4-Chloroaniline	NC	3.25E+00	NC	3.51E-01	NC	1.40E+00	NC	--	NC	1.80E+00	NC	--	NC	NC	5.50E-02	NC
4-Methyl-2-pentanone	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
4-Nitroaniline	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
alpha-BHC	1.05E-06	--	NC	--	NC	2.40E-03	4.19E-10	--	NC	1.10E-03	1.92E-10	--	NC	6.11E-10	--	NC
Antimony	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Arsenic	2.32E-08	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	4.30E+00	9.98E-08
Benzene	6.47E-09	4.55E-01	4.91E-10	6.13E-02	6.61E-11	6.80E-01	7.34E-10	--	NC	7.50E-01	8.09E-10	--	NC	2.10E-09	4.40E-02	2.85E-10
Benzo(k)fluoranthene	8.19E-07	--	NC	1.20E-03	1.64E-10	--	NC	--	NC	--	NC	--	NC	1.64E-10	--	NC
beta-BHC	2.94E-07	--	NC	--	NC	--	NC	--	NC	1.00E-03	4.90E-11	--	NC	4.90E-11	--	NC
Cadmium	NC	--	NC	3.63E-02	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Carbazole	1.52E-08	--	NC	--	NC	3.50E-03	8.84E-12	--	NC	2.60E-02	6.57E-11	--	NC	7.45E-11	--	NC
Chlorobenzene	NC	5.15E+00	NC	1.66E+00	NC	1.40E+00	NC	--	NC	3.80E+00	NC	--	NC	NC	--	NC
Chloroform	5.92E-10	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	7.60E-02	4.50E-11
Cis/Trans-1,2-Dichloroethene	NC	7.25E-01	NC	4.05E-01	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
delta-BHC	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Ethylbenzene	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Heptachlor	5.25E-07	--	NC	--	NC	2.50E-03	2.19E-10	--	NC	--	NC	--	NC	2.19E-10	--	NC
Heptachlor epoxide	1.06E-06	--	NC	--	NC	5.60E-03	9.91E-10	--	NC	--	NC	--	NC	9.91E-10	--	NC
Molybdenum	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Naphthalene	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Nickel	NC	--	NC	4.40E+00	NC	--	NC	--	NC	--	NC	--	NC	NC	1.80E+02	NC
Nitrobenzene	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Pentachlorophenol	7.30E-07	--	NC	--	NC	--	NC	--	NC	3.30E-01	4.01E-08	--	NC	4.01E-08	--	NC
Phenol	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Tetrachloroethene	2.40E-08	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Toluene	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Total 2,3,7,8-TCDD TEQ	3.53E+00	--	NC	--	NC	3.05E-06	1.79E-06	4.74E-08	2.79E-08	7.69E-07	4.53E-07	--	NC	2.28E-06	--	NC
Total PCBs	1.46E-05	--	NC	--	NC	--	NC	--	NC	5.88E-03	1.43E-08	--	NC	1.43E-08	--	NC
Trichloroethene	1.80E-09	--	NC	1.04E-01	3.11E-11	--	NC	--	NC	--	NC	--	NC	3.11E-11	--	NC
Vanadium	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Vinyl chloride	5.91E-08	7.35E-01	7.24E-09	2.00E-01	1.97E-09	--	NC	--	NC	--	NC	--	NC	9.21E-09	--	NC
Zinc	NC	--	NC	1.83E+01	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Total:			1.30E-08		7.33E-09		1.80E-06		2.79E-08		5.41E-07		1.02E-09	2.39E-06		1.00E-07

Notes
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium
(a) - Risks divided by the number of wells in this area

P-76

SAUGET AREA 1 - EE/CA AND RI/FS
MLE
NONCARCINOGENIC ASSESSMENT
INCIDENTAL INGESTION AND DERMAL CONTACT
GROUNDWATER
CONSTRUCTION WORKER - MLE

Constituent	Unit Concentration In Groundwater (mg/l)	Oral - Water Absorption Adjustment Factor	Dermal - Water Absorption Adjustment Factor	Dermal PeMLEability Constant (cm/hr)	Oral Reference Dose (mg/kg-day)	ADDIng Construction Worker (mg/kg-day)	Chronic Average Daily Dose-Ing. (mg/kg-day)	ADDder Construction Worker (mg/kg-day)	Chronic Average Daily Dose-Der. (mg/kg-day)	Hazard Index - Ingestion	Hazard Index - Dermal Contact	Total Hazard Index
1,1,2,2-Tetrachloroethane	1.00E+00	1	1	9.00E-03	6.00E-02	9.78E-07	9.78E-07	5.88E-06	5.88E-06	1.63E-05	9.80E-05	1.14E-04
1,4-Dichlorobenzene	1.00E+00	1	1	6.20E-02	3.00E-02	9.78E-07	9.78E-07	4.05E-05	4.05E-05	3.26E-05	1.35E-03	1.38E-03
2,4,5-TP (Silvex)	1.00E+00	1	1	2.33E-03	8.00E-03	9.78E-07	9.78E-07	1.52E-06	1.52E-06	1.22E-04	1.90E-04	3.13E-04
2,4,6-Trichlorophenol	1.00E+00	NA	NA	5.00E-02	NA	NA	NA	NA	NA	NA	NA	NC
2,4-Dichlorophenol	1.00E+00	1	1	2.30E-02	3.00E-03	9.78E-07	9.78E-07	1.50E-05	1.50E-05	3.26E-04	5.01E-03	5.34E-03
2-Chlorophenol	1.00E+00	1	1	1 10E-02	5.00E-03	9.78E-07	9.78E-07	7.19E-06	7.19E-06	1.96E-04	1.44E-03	1.63E-03
2-Nitroaniline	1.00E+00	NA	NA	5.45E-03	NA	NA	NA	NA	NA	NA	NA	NC
3-Methylphenol/4-Methylphenol	1.00E+00	1	1	1.00E-02	5.00E-02	9.78E-07	9.78E-07	6.53E-06	6.53E-06	1.96E-05	1.31E-04	1.50E-04
4,4-DDE	1.00E+00	NA	NA	2.40E-01	NA	NA	NA	NA	NA	NA	NA	NC
4-Chloroaniline	1.00E+00	1	1	6.33E-03	4.00E-03	9.78E-07	9.78E-07	4.14E-06	4.14E-06	2.45E-04	1.03E-03	1.28E-03
4-Methyl-2-pentanone	1.00E+00	1	1	2.77E-03	8.00E-02	9.78E-07	9.78E-07	1.81E-06	1.81E-06	1.22E-05	2.26E-05	3.49E-05
4-Nitroaniline	1.00E+00	NA	NA	2.66E-03	NA	NA	NA	NA	NA	NA	NA	NC
alpha-BHC	1.00E+00	NA	NA	1.63E-02	NA	NA	NA	NA	NA	NA	NA	NC
Antimony	1.00E+00	1	6.7	1.60E-04	4.00E-04	9.78E-07	9.78E-07	7.00E-07	7.00E-07	2.45E-03	1.75E-03	4.20E-03
Arsenic	1.00E+00	1	1	1.60E-04	3.00E-04	9.78E-07	9.78E-07	1.05E-07	1.05E-07	3.26E-03	3.48E-04	3.61E-03
Benzene	1.00E+00	1	2.13	2.10E-02	3.00E-03	9.78E-07	9.78E-07	2.92E-05	2.92E-05	3 26E-04	9.74E-03	1.01E-02
Benzo(k)fluoranthene	1.00E+00	NA	NA	1 20E+00	NA	NA	NA	NA	NA	NA	NA	NC
beta-BHC	1.00E+00	NA	NA	1.60E-02	NA	NA	NA	NA	NA	NA	NA	NC
Cadmium	1.00E+00	1	40	1.00E-03	5.00E-04	9.78E-07	9.78E-07	2.61E-05	2.61E-05	1.96E-03	5.23E-02	5.42E-02
Carbazole	1.00E+00	NA	NA	7.97E-02	NA	NA	NA	NA	NA	NA	NA	NC
Chlorobenzene	1.00E+00	1	1	4.10E-02	2.00E-02	9.78E-07	9.78E-07	2.68E-05	2.68E-05	4.89E-05	1.34E-03	1.39E-03
Chloroform	1.00E+00	1	1	8.90E-03	1.00E-02	9.78E-07	9.78E-07	5.82E-06	5.82E-06	9.78E-05	5.82E-04	6.79E-04
Cis/Trans-1,2-Dichloroethene	1.00E+00	1	1	1.00E-02	1.00E-02	9.78E-07	9.78E-07	6.53E-06	6.53E-06	9.78E-05	6.53E-04	7.51E-04
delta-BHC	1.00E+00	1	1	1.60E-02	3.00E-04	9.78E-07	9.78E-07	1.05E-05	1.05E-05	3.26E-03	3.48E-02	3.81E-02
Ethylbenzene	1.00E+00	1	1	7.40E-02	1.00E-01	9.78E-07	9.78E-07	4.84E-05	4.84E-05	9.78E-06	4.84E-04	4.93E-04
Heptachlor	1.00E+00	1	1	1.10E-02	5.00E-04	9.78E-07	9.78E-07	7.19E-06	7.19E-06	1.96E-03	1.44E-02	1.63E-02
Heptachlor epoxide	1.00E+00	1	1	1.10E-02	1.30E-05	9.78E-07	9.78E-07	7.19E-06	7.19E-06	7.53E-02	5.53E-01	6.28E-01
Molybdenum	1.00E+00	1	1	1.60E-04	5.00E-03	9.78E-07	9.78E-07	1.05E-07	1.05E-07	1.96E-04	2.09E-05	2.17E-04
Naphthalene	1.00E+00	1	1	6.90E-02	2.00E-02	9.78E-07	9.78E-07	4.51E-05	4.51E-05	4.89E-05	2.25E-03	2.30E-03
Nickel	1.00E+00	1	77	5.45E-05	2.00E-02	9.78E-07	9.78E-07	2.74E-06	2.74E-06	4.89E-05	1.37E-04	1.86E-04
Nitrobenzene	1.00E+00	1	1	6.96E-03	5.00E-04	9.78E-07	9.78E-07	4.55E-06	4.55E-06	1.96E-03	9.10E-03	1.11E-02
Pentachlorophenol	1.00E+00	1	1	6.50E-01	3.00E-02	9.78E-07	9 78E-07	4.25E-04	4 25E-04	3.26E-05	1.42E-02	1 42E-02
Phenol	1.00E+00	1	1	5.50E-03	6.00E-01	9.78E-07	9.78E-07	3.59E-06	3.59E-06	1.63E-06	5.99E-06	7.62E-06
Tetrachloroethene	1.00E+00	1	1	4.80E-02	1.00E-02	9.78E-07	9.78E-07	3.14E-05	3.14E-05	9.78E-05	3.14E-03	3.23E-03
Toluene	1.00E+00	1	1	4.50E-02	2.00E-01	9.78E-07	9.78E-07	2.94E-05	2.94E-05	4.89E-06	1.47E-04	1.52E-04
Total 2,3,7,8-TCDD TEQ	1.00E+00	NA	NA	1.40E+00	NA	NA	NA	NA	NA	NA	NA	NC
Total PCBs	1.00E+00	1	1.1	7.10E-01	2.00E-05	9.78E-07	9.78E-07	5.10E-04	5.10E-04	4.89E-02	2.55E+01	2.56E+01
Trichloroethene	1.00E+00	1	1	1.60E-02	6.00E-03	9.78E-07	9.78E-07	1.05E-05	1 05E-05	1.63E-04	1.74E-03	1.91E-03
Vanadium	1.00E+00	1	10	1.60E-04	7.00E-03	9.78E-07	9.78E-07	1.05E-06	1.05E-06	1.40E-04	1.49E-04	2.89E-04
Vinyl chloride	1.00E+00	1	1	7.30E-03	3.00E-03	9.78E-07	9.78E-07	4.77E-06	4.77E-06	3.26E-04	1.59E-03	1.92E-03
Zinc	1.00E+00	1.6	3.03	6.00E-04	3.00E-01	1.57E-06	1.57E-06	1.19E-06	1.19E-06	5.22E-06	3.96E-06	9.18E-06

TABLE
POTENTIAL HAZARD INDEX - MLE
INCIDENTAL INGESTION AND DERMAL CONTACT
GROUNDWATER
CONSTRUCTION WORKER- MLE

Constituent	Reference HQ (per mg/L)	Fill Area G							Fill Area H						
		EE-05		EEG-106		EEG-107			EE-01		EE-02		EE-03		
		EPC (mg/L)	HQ (a)	EPC (mg/L)	HQ (a)	EPC (mg/L)	HQ (a)	Total	EPC (mg/L)	HQ (a)	EPC (mg/L)	HQ (a)	EPC (mg/L)	HQ (a)	Total
1,1,2,2-Tetrachloroethane	1.14E-04	--	NC	--	NC	--	NC	NC	1 20E-02	4.57E-07	--	NC	--	NC	4.57E-07
1,4-Dichlorobenzene	1.38E-03	--	NC	--	NC	8.50E-01	3 92E-04	3.92E-04	2.20E+00	1.01E-03	6.35E-01	2.93E-04	--	NC	1 31E-03
2,4,5-TP (Silvex)	3.13E-04	3 90E-01	4.06E-05	--	NC	--	NC	4.06E-05	--	NC	--	NC	--	NC	NC
2,4,6-Trichlorophenol	NC	--	NC	--	NC	--	NC	NC	2 70E-01	NC	4.65E-01	NC	--	NC	NC
2,4-Dichlorophenol	5.34E-03	--	NC	--	NC	3 60E+00	6 40E-03	6 40E-03	--	NC	3.70E-01	6.58E-04	--	NC	6.58E-04
2-Chlorophenol	1 63E-03	--	NC	--	NC	6 30E-01	3 43E-04	3.43E-04	--	NC	--	NC	--	NC	NC
2-Nitroaniline	NC	--	NC	--	NC	--	NC	NC	--	NC	1.35E-02	NC	--	NC	NC
3-Methylphenol/4-Methylphenol	1.50E-04	--	NC	--	NC	2.40E+00	1.20E-04	1 20E-04	--	NC	--	NC	--	NC	NC
4,4-DDE	NC	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
4-Chloroaniline	1 28E-03	1.60E+00	6 82E-04	--	NC	2 30E+01	9.80E-03	1 05E-02	1.80E+00	7.67E-04	7 75E-01	3.30E-04	--	NC	1.10E-03
4-Methyl-2-pentanone	3.49E-05	--	NC	--	NC	1.30E+00	1.51E-05	1.51E-05	--	NC	--	NC	--	NC	NC
4-Nitroaniline	NC	8 40E-03	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
alpha-BHC	NC	--	NC	8 30E-03	NC	6 00E-03	NC	NC	--	NC	4.95E-04	NC	--	NC	NC
Antimony	4 20E-03	--	NC	--	NC	--	NC	NC	--	NC	1.05E-01	1.47E-04	--	NC	1.47E-04
Arsenic	3 61E-03	--	NC	--	NC	--	NC	NC	--	NC	1 25E+00	1.50E-03	--	NC	1.50E-03
Benzene	1.01E-02	1.10E-01	3.69E-04	--	NC	3 70E+00	1 24E-02	1.28E-02	1.50E+00	5.03E-03	2 25E+00	7.55E-03	--	NC	1 26E-02
Benzo(k)fluoranthene	NC	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
beta-BHC	NC	--	NC	3.60E-04	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
Cadmium	5.42E-02	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
Carbazole	NC	--	NC	--	NC	--	NC	NC	5.20E-03	NC	--	NC	--	NC	NC
Chlorobenzene	1.39E-03	6 20E-01	2.87E-04	--	NC	4.30E+00	1.99E-03	2 28E-03	1.20E+00	5.55E-04	4.35E+00	2.01E-03	--	NC	2.57E-03
Chloroform	6.79E-04	--	NC	--	NC	--	NC	NC	--	NC	4.25E-01	9.62E-05	--	NC	9.62E-05
Cis/Trans-1,2-Dichloroethene	7.51E-04	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
delta-BHC	3 81E-02	3 60E-04	4.57E-06	--	NC	1.70E-02	2 16E-04	2 21E-04	--	NC	--	NC	--	NC	NC
Ethylbenzene	4 93E-04	--	NC	--	NC	--	NC	NC	1 80E+00	2.96E-04	--	NC	--	NC	2.96E-04
Heptachlor	1 63E-02	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
Heptachlor epoxide	6 28E-01	--	NC	--	NC	--	NC	NC	--	NC	4.40E-03	9.21E-04	--	NC	9.21E-04
Molybdenum	2.17E-04	4 50E-01	3 25E-05	--	NC	--	NC	3 25E-05	--	NC	--	NC	--	NC	NC
Naphthalene	2 30E-03	3 90E-01	2.99E-04	--	NC	2 10E+00	1 61E-03	1 91E-03	2.30E+00	1 77E-03	1.95E-01	1 50E-04	--	NC	1.92E-03
Nickel	1.86E-04	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
Nitrobenzene	1.11E-02	--	NC	--	NC	--	NC	NC	--	NC	5.65E-02	2 08E-04	--	NC	2.08E-04
Pentachlorophenol	1.42E-02	--	NC	--	NC	1.01E+00	4.78E-03	4.78E-03	3 35E+00	1.58E-02	6 50E-01	3.07E-03	--	NC	1.89E-02
Phenol	7 62E-06	3 80E-01	9 65E-07	--	NC	1.40E+01	3 56E-05	3.65E-05	--	NC	3 15E-01	8.00E-07	--	NC	8.00E-07
Tetrachloroethene	3 23E-03	--	NC	--	NC	1 70E-01	1.83E-04	1 83E-04	--	NC	--	NC	--	NC	NC
Toluene	1.52E-04	--	NC	--	NC	8 50E+00	4.30E-04	4 30E-04	--	NC	--	NC	--	NC	NC
Total 2,3,7,8-TCDD TEQ	NC	1.78E-07	NC	--	NC	3 60E-06	NC	NC	4 57E-08	NC	--	NC	5 02E-08	NC	NC
Total PCBs	2 56E+01	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
Trichloroethene	1 91E-03	--	NC	--	NC	2 00E-01	1 27E-04	1 27E-04	--	NC	4.95E-02	3 14E-05	--	NC	3.14E-05
Vanadium	2.89E-04	--	NC	--	NC	3.30E-01	3 18E-05	3 18E-05	--	NC	--	NC	--	NC	NC
Vinyl chloride	1.92E-03	--	NC	--	NC	4.10E-02	2.62E-05	2 62E-05	--	NC	--	NC	--	NC	NC
Zinc	9.18E-06	--	NC	--	NC	--	NC	NC	--	NC	--	NC	--	NC	NC
Total HI:			1.72E-03		NC		3.69E-02	4.06E-02		2.63E-02		1.70E-02		NC	4.23E-02

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium
(a) - HQ divided by the number of wells in this area.

P-78

TABLE
POTENTIAL HAZARD INDEX - MLE
INCIDENTAL INGESTION AND DERMAL CONTACT
GROUNDWATER
CONSTRUCTION WORKER- MLE

	Reference	Fill Area I													Fill Area L	
	HQ	AA-I-S1		AA-I-S2		EE-12		EE-13		EE-14		EE-15			EE-109	
Constituent	(per mg/L)	EPC (mg/L)	HQ (a)	EPC (mg/L)	HQ (a)	EPC (mg/L)	HQ (a)	EPC (mg/L)	HQ (a)	EPC (mg/L)	HQ (a)	EPC (mg/L)	HQ (a)	Total	EPC (mg/L)	HQ (a)
1,1,2,2-Tetrachloroethane	1.14E-04	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
1,4-Dichlorobenzene	1.38E-03	2 21E+00	5.09E-04	2.15E+00	4 96E-04	--	NC	--	NC	1.40E+01	3.23E-03	4.30E-01	9.91E-05	4.33E-03	--	NC
2,4,5-TP (Silvex)	3 13E-04	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
2,4,6-Trichlorophenol	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
2,4-Dichlorophenol	5.34E-03	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	2.60E-02	1.39E-04
2-Chlorophenol	1.63E-03	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
2-Nitroaniline	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
3-Methylphenol/4-Methylphenol	1 50E-04	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
4,4-DDE	NC	--	NC	--	NC	2 20E-03	NC	--	NC	--	NC	--	NC	NC	--	NC
4-Chloroaniline	1 28E-03	3 25E+00	6 93E-04	3 51E-01	7.48E-05	1.40E+00	2 98E-04	--	NC	1.80E+00	3.84E-04	--	NC	1.45E-03	5.50E-02	7.03E-05
4-Methyl-2-pentanone	3.49E-05	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
4-Nitroaniline	NC	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
alpha-BHC	NC	--	NC	--	NC	2.40E-03	NC	--	NC	1.10E-03	NC	--	NC	NC	--	NC
Antimony	4 20E-03	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Arsenic	3 61E-03	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	4.30E+00	1.55E-02
Benzene	1.01E-02	4 55E-01	7.64E-04	6.13E-02	1.03E-04	6 80E-01	1 14E-03	--	NC	7.50E-01	1.26E-03	--	NC	3.27E-03	4.40E-02	4.43E-04
Benzo(k)fluoranthene	NC	--	NC	1.20E-03	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
beta-BHC	NC	--	NC	--	NC	--	NC	--	NC	1.00E-03	NC	--	NC	NC	--	NC
Cadmium	5.42E-02	--	NC	3.63E-02	3.28E-04	--	NC	--	NC	--	NC	--	NC	3.28E-04	--	NC
Carbazole	NC	--	NC	--	NC	3 50E-03	NC	--	NC	2.60E-02	NC	--	NC	NC	--	NC
Chlorobenzene	1.39E-03	5.15E+00	1.19E-03	1.66E+00	3 84E-04	1.40E+00	3.24E-04	--	NC	3 80E+00	8 79E-04	--	NC	2 78E-03	--	NC
Chloroform	6.79E-04	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	7.60E-02	5.16E-05
Cis/Trans-1,2-Dichloroethene	7.51E-04	7 25E-01	9 08E-05	4.05E-01	5 07E-05	--	NC	--	NC	--	NC	--	NC	1.41E-04	--	NC
delta-BHC	3.81E-02	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Ethylbenzene	4 93E-04	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Heptachlor	1 63E-02	--	NC	--	NC	2 50E-03	6.81E-06	--	NC	--	NC	--	NC	6.81E-06	--	NC
Heptachlor epoxide	6.28E-01	--	NC	--	NC	5 60E-03	5 86E-04	--	NC	--	NC	--	NC	5.86E-04	--	NC
Molybdenum	2.17E-04	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Naphthalene	2 30E-03	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Nickel	1 86E-04	--	NC	4 40E+00	1 36E-04	--	NC	--	NC	--	NC	--	NC	1.36E-04	1.80E+02	3.35E-02
Nitrobenzene	1.11E-02	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Pentachlorophenol	1.42E-02	--	NC	--	NC	--	NC	--	NC	3 30E-01	7.80E-04	--	NC	7.80E-04	--	NC
Phenol	7 62E-06	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Tetrachloroethene	3.23E-03	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Toluene	1.52E-04	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Total 2,3,7,8-TCDD TEQ	NC	--	NC	--	NC	3 05E-06	NC	4 74E-08	NC	7.69E-07	NC	--	NC	NC	--	NC
Total PCBs	2.56E+01	--	NC	--	NC	--	NC	--	NC	5.88E-03	2.51E-02	--	NC	2 51E-02	--	NC
Trichloroethene	1 91E-03	--	NC	1.04E-01	3 30E-05	--	NC	--	NC	--	NC	--	NC	3.30E-05	--	NC
Vanadium	2.89E-04	--	NC	--	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Vinyl chloride	1.92E-03	7 35E-01	2 35E-04	2 00E-01	6 39E-05	--	NC	--	NC	--	NC	--	NC	2 99E-04	--	NC
Zinc	9.18E-06	--	NC	1.83E+01	2.80E-05	--	NC	--	NC	--	NC	--	NC	2.80E-05	--	NC
	Total HI:		3.48E-03		1.70E-03		2.36E-03		NC		3.16E-02		9.91E-05	3.92E-02		4.97E-02

Notes.
-- Not a constituent of potential concern in this area/medium
EPC - Exposure Point Concentration
HI - Hazard Index
HQ - Hazard Quotient
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium
(a) - HQ divided by the number of wells in this area

P-79

SAUGET AREA 1 - EE/CA AND RI/FS
MLE

Receptors Evaluated:	
Receptor:	MLE Construction Worker

ASSUMPTIONS FOR INHALATION OF	CONSTRUCTION WORKER - MLE TRENCH AIR	Assumed Value	Units	Calculated Value
Inhalation Rate	MLE Construction Worker	1.5	(m^3 air/hour)	
Body Weight	MLE Construction Worker	70	(kg)	
Exposure Time	MLE Construction Worker	8	(hrs/day) =	8.00E+00
Exposure Frequency	MLE Construction Worker	20	(days)/365 (days) =	5.48E-02
Exposure Duration (cancer)	MLE Construction Worker	1	(yrs)/70(yrs) =	1.43E-02
Exposure Duration (noncancer)	MLE Construction Worker	1	(yrs)/1(yrs) =	1.00E+00
Lifetime		70	(years)	

P-80

TABLE
POTENTIAL CARCINOGENIC RISK
CONSTRUCTION WORKER - MLE
TRENCH AIR

Constituent	Reference Risk (per mg/m3)	Fill Area G					Fill Area H				
		EE-05		EEG-107			EE-01		EE-02		
		EPC (mg/m3)	Risk (a)	EPC (mg/m3)	Risk (a)	Total	EPC (mg/m3)	Risk (a)	EPC (mg/m3)	Risk (a)	Total
1,1,2,2-Tetrachloroethane	2.72E-05	--	NC	--	NC	NC	2.80E-04	3.81E-09	--	NC	3.81E-09
4-Methyl-2-pentanone	NC	--	NC	1.25E-01	NC	NC	--	NC	--	NC	NC
Benzene	1.03E-06	2.98E-03	1.54E-09	1.00E-01	5.18E-08	5.33E-08	4.06E-02	2.10E-08	6.09E-02	3.15E-08	5.25E-08
Chlorobenzene	NC	1.55E-02	NC	1.07E-01	NC	NC	3.00E-02	NC	1.09E-01	NC	NC
Chloroform	7.13E-06	--	NC	--	NC	NC	--	NC	1.16E-02	4.15E-08	4.15E-08
Ethylbenzene	NC	--	NC	--	NC	NC	4.19E-02	NC	--	NC	NC
Naphthalene	NC	8.51E-03	NC	4.58E-02	NC	NC	5.02E-02	NC	4.26E-03	NC	NC
Tetrachloroethene	2.68E-07	--	NC	4.10E-03	5.50E-10	5.50E-10	--	NC	--	NC	NC
Toluene	NC	--	NC	2.24E-01	NC	NC	--	NC	--	NC	NC
Trichloroethene	8.05E-07	--	NC	2.62E-02	1.05E-08	1.05E-08	--	NC	6.48E-03	2.61E-09	2.61E-09
Vinyl chloride	2.07E-06	--	NC	1.30E-03	1.34E-09	1.34E-09	--	NC	--	NC	NC
	Total:		**1.54E-09**		**6.42E-08**	**6.57E-08**		**2.48E-08**		**7.56E-08**	**1.00E-07**

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
(a) - Risk divided by number of wells in this area.

TABLE
POTENTIAL CARCINOGENIC RISK
CONSTRUCTION WORKER - MLE
TRENCH AIR

Constituent	Reference Risk (per mg/m3)	Fill Area I									L	
		AA-I-S1		AA-I-S2		EE-12		EE-14			EEG-109	
		EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	Total	EPC (mg/m3)	Risk
1,1,2,2-Tetrachloroethane	2.72E-05	--	NC	--	NC	--	NC	--	NC	NC	--	NC
4-Methyl-2-pentanone	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Benzene	1.03E-06	1.23E-02	3.18E-09	1.66E-03	4.29E-10	1.84E-02	4.76E-09	2.03E-02	5.25E-09	1.36E-08	1.19E-03	1.23E-09
Chlorobenzene	NC	1.29E-01	NC	4.14E-02	NC	3.50E-02	NC	9.49E-02	NC	NC	--	NC
Chloroform	7.13E-06	--	NC	--	NC	--	NC	--	NC	NC	2.08E-03	1.48E-08
Ethylbenzene	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Naphthalene	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Tetrachloroethene	2.68E-07	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Toluene	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Trichloroethene	8.05E-07	--	NC	1.36E-02	2.74E-09	--	NC	--	NC	2.74E-09	--	NC
Vinyl chloride	2.07E-06	2.32E-02	1.20E-08	6.32E-03	3.27E-09	--	NC	--	NC	1.53E-08	--	NC
	Total:		**1.52E-08**		**6.43E-09**		**4.76E-09**		**5.25E-09**	**3.16E-08**		**1.61E-08**

Notes:
-- Not a constituent of potential concern in this area/n
EPC - Exposure Point Concentration.
NC - Not Calculated, no dose-response value or not a
(a) - Risk divided by number of wells in this area.

SAUGET AREA 1 - EE/CA AND RI/FS
MLE
NONCARCINOGENIC ASSESSMENT
INHALATION OF
TRENCH AIR
CONSTRUCTION WORKER - MLE

Constituent	Unit Concentration In Air (mg/m³ air)	Inhalation Absorption Adjustment Factor	Inhalation Reference Dose (mg/kg-day)	ADDinh MLE Construction Worker (mg/kg-day)	Chronic Average Daily Dose-inh (mg/kg-day)	Hazard Index - Inhalation
1,1,2,2-Tetrachloroethane	1.00E+00	NA	NA	NA	NA	NC
4-Methyl-2-pentanone	1.00E+00	1	2.29E-02	9.39E-03	9.39E-03	4.11E-01
Benzene	1.00E+00	1	1.70E-03	9.39E-03	9.39E-03	5.53E+00
Chlorobenzene	1.00E+00	1	5.71E-03	9.39E-03	9.39E-03	1.65E+00
Chloroform	1.00E+00	1	8.60E-05	9.39E-03	9.39E-03	1.09E+02
Ethylbenzene	1.00E+00	1	2.86E-01	9.39E-03	9.39E-03	3.28E-02
Naphthalene	1.00E+00	1	8.57E-04	9.39E-03	9.39E-03	1.10E+01
Tetrachloroethene	1.00E+00	1	1.14E-01	9.39E-03	9.39E-03	8.24E-02
Toluene	1.00E+00	1	1.14E-01	9.39E-03	9.39E-03	8.24E-02
Trichloroethene	1.00E+00	NA	NA	NA	NA	NC
Vinyl chloride	1.00E+00	1	2.86E-02	9.39E-03	9.39E-03	3.29E-01

P-83

TABLE
POTENTIAL HAZARD QUOTIENT
CONSTRUCTION WORKER - MLE
TRENCH AIR

	Reference	Fill Area G					Fill Area H				
	HQ	EE-05		EEG-107			EE-01		EE-02		
Constituent	(per mg/m3)	EPC (mg/m3)	HQ (a)	EPC (mg/m3)	HQ (a)	Total	EPC (mg/m3)	HQ (a)	EPC (mg/m3)	HQ (a)	Total
1,1,2,2-Tetrachloroethane	NC	--	NC	--	NC	NC	2.80E-04	NC	--	NC	NC
4-Methyl-2-pentanone	4.11E-01	--	NC	1.25E-01	2.56E-02	2.56E-02	--	NC	--	NC	NC
Benzene	5.53E+00	2.98E-03	8.23E-03	1.00E-01	2.77E-01	2.85E-01	4.06E-02	1.12E-01	6.09E-02	1.68E-01	2.81E-01
Chlorobenzene	1.65E+00	1.55E-02	1.27E-02	1.07E-01	8.83E-02	1.01E-01	3 00E-02	2.46E-02	1.09E-01	8.93E-02	1.14E-01
Chloroform	1.09E+02	--	NC	--	NC	NC	--	NC	1.16E-02	6.36E-01	6.36E-01
Ethylbenzene	3.28E-02	--	NC	--	NC	NC	4.19E-02	6.88E-04	--	NC	6.88E-04
Naphthalene	1.10E+01	8.51E-03	4.67E-02	4.58E-02	2.51E-01	2.98E-01	5.02E-02	2.75E-01	4.26E-03	2.33E-02	2.98E-01
Tetrachloroethene	8.24E-02	--	NC	4.10E-03	1.69E-04	1.69E-04	--	NC	--	NC	NC
Toluene	8.24E-02	--	NC	2.24E-01	9.23E-03	9.23E-03	--	NC	--	NC	NC
Trichloroethene	NC	--	NC	2.62E-02	NC	NC	--	NC	6.48E-03	NC	NC
Vinyl chloride	3.29E-01	--	NC	1.30E-03	2.13E-04	2.13E-04	--	NC	--	NC	NC
	Total HI:		6.76E-02		6.52E-01	7.19E-01		4.13E-01		9.17E-01	1.33E+00

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated, no dose-response value or not a constituent of potential concern in this area/medium.
(a) - HQ divided by number of wells in this area.

P-84

TABLE
POTENTIAL HAZARD QUOTIENT
CONSTRUCTION WORKER - MLE
TRENCH AIR

Constituent	Reference HQ (per mg/m3)	Fill Area I									Fill Area L	
		AA-I-S1		AA-I-S2		EE-12		EE-14			EEG-109	
		EPC (mg/m3)	HQ	EPC (mg/m3)	HQ	EPC (mg/m3)	HQ	EPC (mg/m3)	HQ	Total	EPC (mg/m3)	HQ
1,1,2,2-Tetrachloroethane	NC	--	NC	--	NC	--	NC	--	NC	NC	--	NC
4-Methyl-2-pentanone	4.11E-01	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Benzene	5.53E+00	1.23E-02	1.70E-02	1.66E-03	2.29E-03	1.84E-02	2.54E-02	2.03E-02	2.81E-02	7.28E-02	1.19E-03	6.58E-03
Chlorobenzene	1.65E+00	1.29E-01	5.29E-02	4.14E-02	1.70E-02	3.50E-02	1.44E-02	9.49E-02	3.90E-02	1.23E-01	--	NC
Chloroform	1.09E+02	--	NC	--	NC	--	NC	--	NC	NC	2.08E-03	2.27E-01
Ethylbenzene	3.28E-02	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Naphthalene	1.10E+01	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Tetrachloroethene	8.24E-02	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Toluene	8.24E-02	--	NC	--	NC	--	NC	--	NC	NC	--	NC
Trichloroethene	NC	--	NC	1.36E-02	NC	--	NC	--	NC	NC	--	NC
Vinyl chloride	3.29E-01	2.32E-02	1.91E-03	6.32E-03	5.20E-04	--	NC	--	NC	2.43E-03	--	NC
	Total HI:		7.18E-02		1.99E-02		3.98E-02		6.71E-02	1.99E-01		2.34E-01

Notes:
-- Not a constituent of potential concern in this area/n
EPC - Exposure Point Concentration.
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated, no dose-response value or not
(a) - HQ divided by number of wells in this area.

SAUGET AREA 1 - EE/CA AND RI/FS
RME

Receptors Evaluated	
Receptor 3:	RME Trespassing Teen

ASSUMPTIONS FOR TRESPASSING TEEN - RME INCIDENTIAL INGESTION AND DERMAL CONTACT SURFACE SOIL		Assumed Value	Units	Calculated Value
Soil Ingestion Rate	RME Trespassing Teen	100	(mg soil/day)	
Soil on Skin	RME Trespassing Teen	0.02	(mg/cm^2)	
Skin Exposed	RME Trespassing Teen	3677	(cm^2)	
Body Weight	RME Trespassing Teen	47	(kg)	
Exposure Frequency	RME Trespassing Teen	26	(days)/365(days) =	0.07123288
Exposure Duration (cancer)	RME Trespassing Teen	11	(years)/70(years) =	0.15714286
Exposure Duration (noncancer)	RME Trespassing Teen	11	(yrs)/11(yrs) =	1.00E+00
Lifetime		70	(years)	
Unit Conversion Factor		1.00E-06	(kg/mg)	

22-Dec-00

P-86

SAUGET AREA 1 - EE/CA AND RI/FS
RME
POTENTIAL CARCINOGENIC RISK
INCIDENTIAL INGESTION AND DERMAL CONTACT
SURFACE SOIL
TRESPASSING TEEN - RME

Constituent	Unit Concentration In Soil (mg/kg soil)	Oral - Soil Absorption Adjustment Factor	Dermal - Soil Absorption Adjustment Factor	Oral Cancer Slope Factor (mg/kg-day)$^{-1}$	ADDing RME Trespassing Teen (mg/kg-day)	Lifetime Average Daily Dose-Ing. (mg/kg-day)	ADDder RME Trespassing Teen (mg/kg-day)	Lifetime Average Daily Dose-Der. (mg/kg-day)	Excess Lifetime Cancer Risk - Ingestion	Excess Lifetime Cancer Risk - Dermal Contact	Total Excess Lifetime Cancer Risk
Arsenic	1.00E+00	0.3	0.001	1.50E+00	7.14E-09	7.14E-09	1.75E-11	1.75E-11	1.07E-08	2.63E-11	1.07E-08
Benzo(a)pyrene	1.00E+00	0.29	0.02	7.30E+00	6.91E-09	6.91E-09	3.50E-10	3.50E-10	5.04E-08	2.56E-09	5.30E-08
Copper	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Dibenzo(a,h)anthracene	1.00E+00	0.29	0.02	7.30E+00	6.91E-09	6.91E-09	3.50E-10	3.50E-10	5.04E-08	2.56E-09	5.30E-08
Total 2,3,7,8-TCDD TEQ	1.00E+00	0.5	0.05	1.50E+05	1.19E-08	1.19E-08	8.76E-10	8.76E-10	1.79E-03	1.31E-04	1.92E-03
Total PCBs	1.00E+00	0.83	0.04	2.00E+00	1.98E-08	1.98E-08	7.01E-10	7.01E-10	3.95E-08	1.40E-09	4.09E-08

TABLE
POTENTIAL CARCINOGENIC RISK - RME
INCIDENTIAL INGESTION AND DERMAL CONTACT
SURFACE SOIL
TRESPASSING TEEN - RME
SAUGET AREA 1 - EE/CA AND RI/FS

Constituent	Reference Risk (per mg/kg)	Fill Area H EPC (mg/kg)	Fill Area H Risk	Fill Area I EPC (mg/kg)	Fill Area I Risk	Fill Area L EPC (mg/kg)	Fill Area L Risk
Arsenic	1.07E-08	6.40E+01	6.88E-07	--	NC	3.70E+01	3.98E-07
Benzo(a)pyrene	5.30E-08	--	NC	2.20E+00	1.17E-07	7.00E+00	3.71E-07
Copper	NC	--	NC	1.30E+04	NC	--	NC
Dibenzo(a,h)anthracene	5.30E-08	--	NC	--	NC	1.30E+00	6.89E-08
Total 2,3,7,8-TCDD TEQ	1.92E-03	1.30E-03	2.49E-06	1.20E-02	2.30E-05	--	NC
Total PCBs	4.09E-08	1.52E+00	6.22E-08	1.21E+02	4.97E-06	1.07E+00	4.38E-08
	Total:		3.24E-06		2.81E-05		8.81E-07

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
NC - Not Calculated.

P-88

SAUGET AREA 1 - EE/CA AND RI/FS
RME
NONCARCINOGENIC HAZARD INDEX
INCIDENTIAL INGESTION AND DERMAL CONTACT
SURFACE SOIL
TRESPASSING TEEN - RME

Constituent	Unit Concentration in Soil (mg/kg-soil)	Oral - Soil Absorption Adjustment Factor	Dermal - Soil Absorption Adjustment Factor	Oral Reference Dose (mg/kg-day)	ADDing RME Trespassing Teen (mg/kg-day)	Chronic Average Daily Dose-Ing. (mg/kg-day)	ADDder RME Trespassing Teen (mg/kg-day)	Chronic Average Daily Dose-Der. (mg/kg-day)	Hazard Index - Ingestion	Hazard Index - Dermal Contact	Total Hazard Index
Arsenic	1.00E+00	0.3	0.001	3.00E-04	4.55E-08	4.55E-08	1.11E-10	1.11E-10	1.52E-04	3.72E-07	1.52E-04
Benzo(a)pyrene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Copper	1.00E+00	1	0.002	3.70E-02	1.52E-07	1.52E-07	2.23E-10	2.23E-10	4.10E-06	6.02E-09	4.10E-06
Dibenzo(a,h)anthracene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Total 2,3,7,8-TCDD TEQ	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Total PCBs	1.00E+00	0.83	0.04	2.00E-05	1.26E-07	1.26E-07	4.46E-09	4.46E-09	6.29E-03	2.23E-04	6.51E-03

P-89

TABLE
POTENTIAL HAZARD INDEX - RME
INCIDENTIAL INGESTION AND DERMAL CONTACT
SURFACE SOIL
TRESPASSING TEEN - RME
SAUGET AREA 1 - EE/CA AND RI/FS

Constituent	Reference HQ (per mg/kg)	Fill Area H EPC (mg/kg)	Fill Area H HQ	Fill Area I EPC (mg/kg)	Fill Area I HQ	Fill Area L EPC (mg/kg)	Fill Area L HQ
Arsenic	1.52E-04	6.40E+01	9.72E-03	--	NC	3.70E+01	5.62E-03
Benzo(a)pyrene	NC	--	NC	2.20E+00	NC	7.00E+00	NC
Copper	4.10E-06	--	NC	1.30E+04	5.33E-02	--	NC
Dibenzo(a,h)anthracene	NC	--	NC	--	NC	1.30E+00	NC
Total 2,3,7,8-TCDD TEQ	NC	1.30E-03	NC	1.20E-02	NC	--	NC
Total PCBs	6.51E-03	1.52E+00	9.90E-03	1.21E+02	7.90E-01	1.07E+00	6.97E-03
Total HI:			**1.96E-02**		**8.43E-01**		**1.26E-02**

Notes:
-- *Not a constituent of potential concern in this area/medium.*
EPC - Exposure Point Concentration.
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated.

SAUGET AREA 1 - EE/CA AND RI/FS
RME

Receptors Evaluated:	
Receptor 1:	RME Trespassing Teen

ASSUMPTIONS FOR TRESPASSING TEEN - RME INHALATION OF OUTDOOR AIR PARTICULATES		Assumed Value	Units	Calculated Value
Inhalation Rate	RME Trespassing Teen	1.2	(m^3 air/hour)	
Body Weight	RME Trespassing Teen	47	(kg)	
Exposure Time	RME Trespassing Teen	2	(hrs/day) =	2.00E+00
Exposure Frequency	RME Trespassing Teen	26	(days)/365 (days) =	7.12E-02
Exposure Duration (cancer)	RME Trespassing Teen	11	(yrs)/70(yrs) =	1.57E-01
Exposure Duration (noncancer)	RME Trespassing Teen	11	(yrs)/11(yrs) =	1.00E+00
Lifetime		70	(years)	

P-91

SAUGET AREA 1 - EE/CA AND RI/FS
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR PARTICULATES
TRESPASSING TEEN - RME

Constituent	Unit Concentration In Air (mg/m³ air)	Inhalation Absorption Adjustment Factor	Inhalation Cancer Slope Factor (mg/kg-day)⁻¹	ADDinh RME Trespassing Teen (mg/kg-day)	Lifetime Average Daily Dose - Inh. (mg/kg-day)	Excess Lifetime Cancer Risk - Inhalation
Arsenic	1.00E+00	1	1.50E+01	5.72E-04	5.72E-04	8.57E-03
Benzo(a)pyrene	1.00E+00	1	3.10E+00	5.72E-04	5.72E-04	1.77E-03
Copper	1.00E+00	NA	NA	NA	NA	NC
Dibenzo(a,h)anthracene	1.00E+00	1	3.10E+00	5.72E-04	5.72E-04	1.77E-03
Total 2,3,7,8-TCDD TEQ	1.00E+00	1	1.50E+05	5.72E-04	5.72E-04	8.57E+01
Total PCBs	1.00E+00	1	2.00E+00	5.72E-04	5.72E-04	1.14E-03

P–92

TABLE
POTENTIAL CARCINOGENIC RISK
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR PARTICULATES
TRESPASSING TEEN - RME

Constituent	Reference Risk (per mg/m3)	Fill Area H EPC (mg/m3)	Fill Area H Risk	Fill Area I EPC (mg/m3)	Fill Area I Risk	Fill Area L EPC (mg/m3)	Fill Area L Risk
Arsenic	8.57E-03	8.11E-08	6.95E-10	--	NC	3.13E-08	2.68E-10
Benzo(a)pyrene	1.77E-03	--	NC	3.64E-09	6.46E-12	5.91E-09	1.05E-11
Copper	NC	--	NC	2.15E-05	NC	--	NC
Dibenzo(a,h)anthracene	1.77E-03	--	NC	--	NC	1.10E-09	1.95E-12
Total 2,3,7,8-TCDD TEQ	8.57E+01	1.65E-12	1.41E-10	1.99E-11	1.70E-09	--	NC
Total PCBs	1.14E-03	1.93E-09	2.20E-12	2.01E-07	2.30E-10	9.04E-10	1.03E-12
	Total:		8.38E-10		1.94E-09		2.82E-10

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
NC - Not Calculated.

P-93

SAUGET AREA 1 - EE/CA AND RI/FS
NONCARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR PARTICULATES
TRESPASSING TEEN - RME

Constituent	Unit Concentration In Air (mg/m³ air)	Inhalation Absorption Adjustment Factor	Inhalation Reference Dose (mg/kg-day)	ADDinh Trespassing Teen (mg/kg-day)	Chronic Average Daily Dose-Inh (mg/kg-day)	Hazard Index - Inhalation
Arsenic	1.00E+00	NA	NA	NA	NA	NC
Benzo(a)pyrene	1.00E+00	NA	NA	NA	NA	NC
Copper	1.00E+00	NA	NA	NA	NA	NC
Dibenzo(a,h)anthracene	1.00E+00	NA	NA	NA	NA	NC
Total 2,3,7,8-TCDD TEQ	1.00E+00	NA	NA	NA	NA	NC
Total PCBs	1.00E+00	NA	NA	NA	NA	NC

SAUGET AREA 1 - EE/CA AND RI/FS
RME

Receptors Evaluated:	
Receptor 1:	RME Trespassing Teen

ASSUMPTIONS FOR TRESPASSING TEEN - RME INHALATION OF OUTDOOR AIR -VOCs		Assumed Value	Units	Calculated Value
Inhalation Rate	RME Trespassing Teen	1.2	(m^3 air/hour)	
Body Weight	RME Trespassing Teen	47	(kg)	
Exposure Time	RME Trespassing Teen	2	(hrs/day) =	2.00E+00
Exposure Frequency	RME Trespassing Teen	26	(days)/365 (days) =	7.12E-02
Exposure Duration (cancer)	RME Trespassing Teen	11	(yrs)/70(yrs) =	1.57E-01
Exposure Duration (noncancer)	RME Trespassing Teen	11	(yrs)/11(yrs) =	1.00E+00
Lifetime		70	(years)	

P-95

SAUGET AREA 1 - EE/CA AND RI/FS
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR -VOCs
TRESPASSING TEEN - RME

Constituent	Unit Concentration In Air (mg/m^3 air)	Inhalation Absorption Adjustment Factor	Inhalation Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	ADDinh RME Trespassing Teen (mg/kg-day)	Lifetime Average Daily Dose - Inh. (mg/kg-day)	Excess Lifetime Cancer Risk - Inhalation
1,1,2,2-Tetrachloroethane	1.00E+00	1	2.03E-01	5.72E-04	5.72E-04	1.16E-04
4-Methyl-2-pentanone	1.00E+00	NA	NA	NA	NA	NC
Benzene	1.00E+00	1	7.70E-03	5.72E-04	5.72E-04	4.40E-06
Chlorobenzene	1.00E+00	NA	NA	NA	NA	NC
Chloroform	1.00E+00	0.66	8.05E-02	3.77E-04	3.77E-04	3.04E-05
Ethylbenzene	1.00E+00	NA	NA	NA	NA	NC
Naphthalene	1.00E+00	NA	NA	NA	NA	NC
Tetrachloroethene	1.00E+00	1	2.00E-03	5.72E-04	5.72E-04	1.14E-06
Toluene	1.00E+00	NA	NA	NA	NA	NC
Trichloroethene	1.00E+00	1	6.00E-03	5.72E-04	5.72E-04	3.43E-06
Vinyl chloride	1.00E+00	1	1.54E-02	5.72E-04	5.72E-04	8.80E-06

TABLE
POTENTIAL CARCINOGENIC RISK
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR -VOCs
TRESPASSING TEEN - RME

Constituent	Reference Risk (per mg/m3)	Fill Area G (a)		Fill Area H (a)		Fill Area I (a)		Fill Area L (a)	
		EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk
1,1,2,2-Tetrachloroethane	1.16E-04	--	NC	2.50E-07	2.90E-11	--	NC	--	NC
4-Methyl-2-pentanone	NC	9.50E-06	NC	--	NC	--	NC	--	NC
Benzene	4.40E-06	1.40E-04	6.16E-10	1.40E-04	6.16E-10	1.20E-04	5.28E-10	1.00E-06	4.40E-12
Chlorobenzene	NC	9.50E-05	NC	1.60E-04	NC	8.10E-04	NC	--	NC
Chloroform	3.04E-05	--	NC	2.50E-05	7.59E-10	--	NC	1.40E-06	4.25E-11
Ethylbenzene	NC	--	NC	1.20E-04	NC	--	NC	--	NC
Naphthalene	NC	6.90E-06	NC	1.30E-05	NC	--	NC	--	NC
Tetrachloroethene	1.14E-06	1.50E-05	1.71E-11	--	NC	--	NC	--	NC
Toluene	NC	3.40E-04	NC	--	NC	--	NC	--	NC
Trichloroethene	3.43E-06	1.70E-05	5.83E-11	7.00E-06	2.40E-11	6.40E-05	2.19E-10	--	NC
Vinyl chloride	8.80E-06	2.30E-05	2.02E-10	--	NC	2.30E-03	2.02E-08	--	NC
	Total:		**8.94E-10**		**1.43E-09**		**2.10E-08**		**4.69E-11**

Notes:
-- Not a constituent of potential concern in this area/medium.
NC - Not Calculated.
(a) - Maximum outdoor air concentration from this area.

SAUGET AREA 1 - EE/CA AND RI/FS
NONCARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR -VOCs
TRESPASSING TEEN - RME

Constituent	Unit Concentration In Air (mg/m^3 air)	Inhalation Absorption Adjustment Factor	Inhalation Reference Dose (mg/kg-day)	ADDinh Trespassing Teen (mg/kg-day)	Chronic Average Daily Dose-Inh (mg/kg-day)	Hazard Index - Inhalation
1,1,2,2-Tetrachloroethane	1.00E+00	NA	NA	NA	NA	NC
4-Methyl-2-pentanone	1.00E+00	1	2.29E-02	3.64E-03	3.64E-03	1.59E-01
Benzene	1.00E+00	1	1.70E-03	3.64E-03	3.64E-03	2.14E+00
Chlorobenzene	1.00E+00	1	5.71E-03	3.64E-03	3.64E-03	6.37E-01
Chloroform	1.00E+00	1	8.60E-05	3.64E-03	3.64E-03	4.23E+01
Ethylbenzene	1.00E+00	1	2.86E-01	3.64E-03	3.64E-03	1.27E-02
Naphthalene	1.00E+00	1	8.57E-04	3.64E-03	3.64E-03	4.24E+00
Tetrachloroethene	1.00E+00	1	1.14E-01	3.64E-03	3.64E-03	3.19E-02
Toluene	1.00E+00	1	1.14E-01	3.64E-03	3.64E-03	3.19E-02
Trichloroethene	1.00E+00	NA	NA	NA	NA	NC
Vinyl chloride	1.00E+00	1	2.86E-02	3.64E-03	3.64E-03	1.27E-01

P-98

TABLE
POTENTIAL HAZARD INDEX
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR -VOCs
TRESPASSING TEEN - RME

Constituent	Reference HQ (per mg/m3)	Fill Area G (a)		Fill Area H (a)		Fill Area I (a)		Fill Area L (a)	
		EPC (mg/m3)	HQ	EPC (mg/m3)	HQ	EPC (mg/m3)	HQ	EPC (mg/m3)	HQ
1,1,2,2-Tetrachloroethane	NC	--	NC	2.50E-07	NC	--	NC	--	NC
4-Methyl-2-pentanone	1.59E-01	9.50E-06	1.51E-06	--	NC	--	NC	--	NC
Benzene	2.14E+00	1.40E-04	3.00E-04	1.40E-04	3.00E-04	1.20E-04	2.57E-04	1.00E-06	2.14E-06
Chlorobenzene	6.37E-01	9.50E-05	6.05E-05	1.60E-04	1.02E-04	8.10E-04	5.16E-04	--	NC
Chloroform	4.23E+01	--	NC	2.50E-05	1.06E-03	--	NC	1.40E-06	5.92E-05
Ethylbenzene	1.27E-02	--	NC	1.20E-04	1.53E-06	--	NC	--	NC
Naphthalene	4.24E+00	6.90E-06	2.93E-05	1.30E-05	5.52E-05	--	NC	--	NC
Tetrachloroethene	3.19E-02	1.50E-05	4.79E-07	--	NC	--	NC	--	NC
Toluene	3.19E-02	3.40E-04	1.08E-05	--	NC	--	NC	--	NC
Trichloroethene	NC	1.70E-05	NC	7.00E-06	NC	6.40E-05	NC	--	NC
Vinyl chloride	1.27E-01	2.30E-05	2.93E-06	--	NC	2.30E-03	2.93E-04	--	NC
	Total HI:		4.05E-04		1.52E-03		1.07E-03		6.14E-05

Notes:
-- Not a constituent of potential concern in this area/medium.
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated.
(a) - Maximum outdoor air concentration from this area.

P-99

SAUGET AREA 1 - EE/CA AND RI/FS
MLE

Receptors Evaluated	
Receptor 3:	MLE Trespassing Teen

ASSUMPTIONS FOR TRESPASSING TEEN - MLE INCIDENTIAL INGESTION AND DERMAL CONTACT SURFACE SOIL		Assumed Value	Units	Calculated Value
Soil Ingestion Rate	MLE Trespassing Teen	50	(mg soil/day)	
Soil on Skin	MLE Trespassing Teen	0.02	(mg/cm^2)	
Skin Exposed	MLE Trespassing Teen	3677	(cm^2)	
Body Weight	MLE Trespassing Teen	47	(kg)	
Exposure Frequency	MLE Trespassing Teen	13	(days)/365(days) =	0.03561644
Exposure Duration (cancer)	MLE Trespassing Teen	11	(years)/70(years) =	0.15714286
Exposure Duration (noncancer)	MLE Trespassing Teen	11	(yrs)/11(yrs) =	1.00E+00
Lifetime		70	(years)	
Unit Conversion Factor		1.00E-06	(kg/mg)	

22-Dec-00

P-100

SAUGET AREA 1 - EE/CA AND RI/FS
MLE
POTENTIAL CARCINOGENIC RISK
INCIDENTIAL INGESTION AND DERMAL CONTACT
SURFACE SOIL
TRESPASSING TEEN - MLE

Constituent	Unit Concentration in Soil (mg/kg soil)	Oral - Soil Absorption Adjustment Factor	Dermal - Soil Absorption Adjustment Factor	Oral Cancer Slope Factor (mg/kg-day)$^{-1}$	ADDing MLE Trespassing Teen (mg/kg-day)	Lifetime Average Daily Dose-Ing. (mg/kg-day)	Lifetime Average Daily Dose-Der. (mg/kg-day)	Excess Lifetime Cancer Risk - Ingestion	Excess Lifetime Cancer Risk - Dermal Contact	Total Excess Lifetime Cancer Risk
Arsenic	1.00E+00	0.3	0.001	1.50E+00	1.79E-09	1.79E-09	8.76E-12	2.68E-09	1.31E-11	2.69E-09
Benzo(a)pyrene	1.00E+00	0.29	0.02	7.30E+00	1.73E-09	1.73E-09	1.75E-10	1.26E-08	1.28E-09	1.39E-08
Copper	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NC
Dibenzo(a,h)anthracene	1.00E+00	0.29	0.02	7.30E+00	1.73E-09	1.73E-09	1.75E-10	1.26E-08	1.28E-09	1.39E-08
Total 2,3,7,8-TCDD TEQ	1.00E+00	0.5	0.05	1.50E+05	2.98E-09	2.98E-09	4.38E-10	4.47E-04	6.57E-05	5.12E-04
Total PCBs	1.00E+00	0.83	0.04	2.00E+00	4.94E-09	4.94E-09	3.50E-10	9.88E-09	7.01E-10	1.06E-08

P–101

TABLE
POTENTIAL CARCINOGENIC RISK - MLE
INCIDENTIAL INGESTION AND DERMAL CONTACT
SURFACE SOIL
TRESPASSING TEEN - MLE
SAUGET AREA 1 - EE/CA AND RI/FS

Constituent	Reference Risk (per mg/kg)	Fill Area H EPC (mg/kg)	Fill Area H Risk	Fill Area I EPC (mg/kg)	Fill Area I Risk	Fill Area L EPC (mg/kg)	Fill Area L Risk
Arsenic	2.69E-09	2.28E+01	6.14E-08	--	NC	3.33E+01	8.97E-08
Benzo(a)pyrene	1.39E-08	--	NC	6.29E-01	8.73E-09	2.30E+00	3.19E-08
Copper	NC	--	NC	6.66E+03	NC	--	NC
Dibenzo(a,h)anthracene	1.39E-08	--	NC	--	NC	4.55E-01	6.32E-09
Total 2,3,7,8-TCDD TEQ	5.12E-04	5.33E-04	2.73E-07	3.34E-03	1.71E-06	--	NC
Total PCBs	1.06E-08	6.60E-01	6.99E-09	3.13E+01	3.31E-07	4.90E-01	5.19E-09
	Total:		3.41E-07		2.05E-06		1.33E-07

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
NC - Not Calculated.

P-102

SAUGET AREA 1 - EE/CA AND RI/FS
MLE
NONCARCINOGENIC HAZARD INDEX
INCIDENTIAL INGESTION AND DERMAL CONTACT
SURFACE SOIL
TRESPASSING TEEN - MLE

Constituent	Unit Concentration in Soil (mg/kg-soil)	Oral - Soil Absorption Adjustment Factor	Dermal - Soil Absorption Adjustment Factor	Oral Reference Dose (mg/kg-day)	Chronic Average Daily Dose-Ing. (mg/kg-day)	ADDder MLE Trespassing Teen (mg/kg-day)	Chronic Average Daily Dose-Der. (mg/kg-day)	Hazard Index - Ingestion	Hazard Index - Dermal Contact	Total Hazard Index
Arsenic	1.00E+00	0.3	0.001	3.00E-04	1.14E-08	5.57E-11	5.57E-11	3.79E-05	1.86E-07	3.81E-05
Benzo(a)pyrene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NC
Copper	1.00E+00	1	0.002	3.70E-02	3.79E-08	1.11E-10	1.11E-10	1.02E-06	3.01E-09	1.03E-06
Dibenzo(a,h)anthracene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NC
Total 2,3,7,8-TCDD TEQ	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NC
Total PCBs	1.00E+00	0.83	0.04	2.00E-05	3.14E-08	2.23E-09	2.23E-09	1.57E-03	1.11E-04	1.68E-03

P-103

TABLE
POTENTIAL HAZARD INDEX - MLE
INCIDENTIAL INGESTION AND DERMAL CONTACT
SURFACE SOIL
TRESPASSING TEEN - MLE
SAUGET AREA 1 - EE/CA AND RI/FS

Constituent	Reference HQ (per mg/kg)	Fill Area H EPC (mg/kg)	Fill Area H HQ	Fill Area I EPC (mg/kg)	Fill Area I HQ	Fill Area L EPC (mg/kg)	Fill Area L HQ
Arsenic	3.81E-05	2.28E+01	8.68E-04	--	NC	3.33E+01	1.27E-03
Benzo(a)pyrene	NC	--	NC	6.29E-01	NC	2.30E+00	NC
Copper	1.03E-06	--	NC	6.66E+03	6.84E-03	--	NC
Dibenzo(a,h)anthracene	NC	--	NC	--	NC	4.55E-01	NC
Total 2,3,7,8-TCDD TEQ	NC	5.33E-04	NC	3.34E-03	NC	--	NC
Total PCBs	1.68E-03	6.60E-01	1.11E-03	3.13E+01	5.27E-02	4.90E-01	8.25E-04
Total HI:			**1.98E-03**		**5.95E-02**		**2.09E-03**

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated.

P-104

SAUGET AREA 1 - EE/CA AND RI/FS
MLE

Receptors Evaluated:	
Receptor 1:	MLE Trespassing Teen

ASSUMPTIONS FOR TRESPASSING TEEN - MLE INHALATION OF OUTDOOR AIR PARTICULATES		**Assumed Value**	**Units**	**Calculated Value**
Inhalation Rate	MLE Trespassing Teen	1.0	(m^3 air/hour)	
Body Weight	MLE Trespassing Teen	47	(kg)	
Exposure Time	MLE Trespassing Teen	2	(hrs/day) =	2.00E+00
Exposure Frequency	MLE Trespassing Teen	13	(days)/365 (days) =	3.56E-02
Exposure Duration (cancer)	MLE Trespassing Teen	11	(yrs)/70(yrs) =	1.57E-01
Exposure Duration (noncancer)	MLE Trespassing Teen	11	(yrs)/11(yrs) =	1.00E+00
Lifetime		70	(years)	

P-105

SAUGET AREA 1 - EE/CA AND RI/FS
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR PARTICULATES
TRESPASSING TEEN - MLE

Constituent	Unit Concentration In Air (mg/m³ air)	Inhalation Absorption Adjustment Factor	Inhalation Cancer Slope Factor (mg/kg-day)⁻¹	ADDinh MLE Trespassing Teen (mg/kg-day)	Lifetime Average Daily Dose - Inh. (mg/kg-day)	Excess Lifetime Cancer Risk - Inhalation
Arsenic	1.00E+00	1	1.50E+01	2.38E-04	2.38E-04	3.57E-03
Benzo(a)pyrene	1.00E+00	1	3.10E+00	2.38E-04	2.38E-04	7.38E-04
Copper	1.00E+00	NA	NA	NA	NA	NC
Dibenzo(a,h)anthracene	1.00E+00	1	3.10E+00	2.38E-04	2.38E-04	7.38E-04
Total 2,3,7,8-TCDD TEQ	1.00E+00	1	1.50E+05	2.38E-04	2.38E-04	3.57E+01
Total PCBs	1.00E+00	1	2.00E+00	2.38E-04	2.38E-04	4.76E-04

P-106

TABLE
POTENTIAL CARCINOGENIC RISK
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR PARTICULATES
TRESPASSING TEEN - MLE

Constituent	Reference Risk (per mg/m3)	Fill Area H		Fill Area I		Fill Area L	
		EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk
Arsenic	3.57E-03	2.89E-08	1.03E-10	--	NC	2.81E-08	1.01E-10
Benzo(a)pyrene	7.38E-04	--	NC	1.04E-09	7.69E-13	1.94E-09	1.43E-12
Copper	NC	--	NC	1.10E-05	NC	--	NC
Dibenzo(a,h)anthracene	7.38E-04	--	NC	--	NC	3.84E-10	2.84E-13
Total 2,3,7,8-TCDD TEQ	3.57E+01	6.75E-13	2.41E-11	5.53E-12	1.98E-10	--	NC
Total PCBs	4.76E-04	8.36E-10	3.98E-13	5.18E-08	2.47E-11	4.14E-10	1.97E-13
	Total:		**1.28E-10**		**2.23E-10**		**1.02E-10**

Notes:
-: Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
NC - Not Calculated.

P-107

SAUGET AREA 1 - EE/CA AND RI/FS
NONCARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR PARTICULATES
TRESPASSING TEEN - MLE

Constituent	Unit Concentration In Air (mg/m^3 air)	Inhalation Absorption Adjustment Factor	Inhalation Reference Dose (mg/kg-day)	ADDinh Trespassing Teen (mg/kg-day)	Chronic Average Daily Dose-inh (mg/kg-day)	Hazard Index - Inhalation
Arsenic	1.00E+00	NA	NA	NA	NA	NC
Benzo(a)pyrene	1.00E+00	NA	NA	NA	NA	NC
Copper	1.00E+00	NA	NA	NA	NA	NC
Dibenzo(a,h)anthracene	1.00E+00	NA	NA	NA	NA	NC
Total 2,3,7,8-TCDD TEQ	1.00E+00	NA	NA	NA	NA	NC
Total PCBs	1.00E+00	NA	NA	NA	NA	NC

P-108

SAUGET AREA 1 - EE/CA AND RI/FS
MLE

Receptors Evaluated:	
Receptor 1:	MLE Trespassing Teen

ASSUMPTIONS FOR TRESPASSING TEEN - MLE INHALATION OF OUTDOOR AIR -VOCs		Assumed Value	Units	Calculated Value
Inhalation Rate	MLE Trespassing Teen	1.0	(m^3 air/hour)	
Body Weight	MLE Trespassing Teen	47	(kg)	
Exposure Time	MLE Trespassing Teen	2	(hrs/day) =	2.00E+00
Exposure Frequency	MLE Trespassing Teen	13	(days)/365 (days) =	3.56E-02
Exposure Duration (cancer)	MLE Trespassing Teen	11	(yrs)/70(yrs) =	1.57E-01
Exposure Duration (noncancer)	MLE Trespassing Teen	11	(yrs)/11(yrs) =	1.00E+00
Lifetime		70	(years)	

P-109

SAUGET AREA 1 - EE/CA AND RI/FS
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR -VOCs
TRESPASSING TEEN - MLE

Constituent	Unit Concentration In Air (mg/m^3 air)	Inhalation Absorption Adjustment Factor	Inhalation Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	ADDinh MLE Trespassing Teen (mg/kg-day)	Lifetime Average Daily Dose - Inh. (mg/kg-day)	Excess Lifetime Cancer Risk - Inhalation
1,1,2,2-Tetrachloroethane	1.00E+00	1	2.03E-01	2.38E-04	2.38E-04	4.83E-05
4-Methyl-2-pentanone	1.00E+00	NA	NA	NA	NA	NC
Benzene	1.00E+00	1	7.70E-03	2.38E-04	2.38E-04	1.83E-06
Chlorobenzene	1.00E+00	NA	NA	NA	NA	NC
Chloroform	1.00E+00	0.66	8.05E-02	1.57E-04	1.57E-04	1.27E-05
Ethylbenzene	1.00E+00	NA	NA	NA	NA	NC
Naphthalene	1.00E+00	NA	NA	NA	NA	NC
Tetrachloroethene	1.00E+00	1	2.00E-03	2.38E-04	2.38E-04	4.76E-07
Toluene	1.00E+00	NA	NA	NA	NA	NC
Trichloroethene	1.00E+00	1	6.00E-03	2.38E-04	2.38E-04	1.43E-06
Vinyl chloride	1.00E+00	1	1.54E-02	2.38E-04	2.38E-04	3.67E-06

TABLE
POTENTIAL CARCINOGENIC RISK
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR -VOCs
TRESPASSING TEEN - MLE

Constituent	Reference Risk (per mg/m3)	Fill Area G (a)		Fill Area H (a)		Fill Area I (a)		Fill Area L (a)	
		EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk
1,1,2,2-Tetrachloroethane	4.83E-05	--	NC	5.50E-08	2.66E-12	--	NC	--	NC
4-Methyl-2-pentanone	NC	9.40E-07	NC	--	NC	--	NC	--	NC
Benzene	1.83E-06	1.20E-05	2.20E-11	2.70E-05	4.95E-11	7.90E-06	1.45E-11	3.00E-07	5.50E-13
Chlorobenzene	NC	9.70E-06	NC	2.40E-05	NC	2.90E-05	NC	--	NC
Chloroform	1.27E-05	--	NC	2.60E-06	3.29E-11	--	NC	4.30E-07	5.44E-12
Ethylbenzene	NC	--	NC	1.70E-05	NC	--	NC	--	NC
Naphthalene	NC	7.00E-07	NC	1.50E-06	NC	--	NC	--	NC
Tetrachloroethene	4.76E-07	1.70E-06	8.10E-13	--	NC	--	NC	--	NC
Toluene	NC	3.20E-05	NC	1.20E-06	NC	--	NC	--	NC
Trichloroethene	1.43E-06	1.60E-06	2.29E-12	--	NC	1.90E-06	2.72E-12	--	NC
Vinyl chloride	3.67E-06	4.60E-06	1.69E-11	--	NC	7.10E-05	2.60E-10	--	NC
	Total:		4.20E-11		8.51E-11		2.78E-10		5.99E-12

Notes:
-- Not a constituent of potential concern in this area/medium.
NC - Not Calculated.
(a) - Outdoor air concentration calculated from average groundwater concentration in this area.

P-111

SAUGET AREA 1 - EE/CA AND RI/FS
NONCARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR -VOCs
TRESPASSING TEEN - MLE

Constituent	Unit Concentration In Air (mg/m^3 air)	Inhalation Absorption Adjustment Factor	Inhalation Reference Dose (mg/kg-day)	ADDinh Trespassing Teen (mg/kg-day)	Chronic Average Daily Dose-Inh (mg/kg-day)	Hazard Index - Inhalation
1,1,2,2-Tetrachloroethane	1.00E+00	NA	NA	NA	NA	NC
4-Methyl-2-pentanone	1.00E+00	1	2.29E-02	1.52E-03	1.52E-03	6.63E-02
Benzene	1.00E+00	1	1.70E-03	1.52E-03	1.52E-03	8.92E-01
Chlorobenzene	1.00E+00	1	5.71E-03	1.52E-03	1.52E-03	2.65E-01
Chloroform	1.00E+00	1	8.60E-05	1.52E-03	1.52E-03	1.76E+01
Ethylbenzene	1.00E+00	1	2.86E-01	1.52E-03	1.52E-03	5.30E-03
Naphthalene	1.00E+00	1	8.57E-04	1.52E-03	1.52E-03	1.77E+00
Tetrachloroethene	1.00E+00	1	1.14E-01	1.52E-03	1.52E-03	1.33E-02
Toluene	1.00E+00	1	1.14E-01	1.52E-03	1.52E-03	1.33E-02
Trichloroethene	1.00E+00	NA	NA	NA	NA	NC
Vinyl chloride	1.00E+00	1	2.86E-02	1.52E-03	1.52E-03	5.30E-02

P-112

TABLE
POTENTIAL HAZARD INDEX
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR -VOCs
TRESPASSING TEEN - MLE

Constituent	Reference HQ (per mg/m3)	Fill Area G (a)		Fill Area H (a)		Fill Area I (a)		Fill Area L (a)	
		EPC (mg/m3)	HQ	EPC (mg/m3)	HQ	EPC (mg/m3)	HQ	EPC (mg/m3)	HQ
1,1,2,2-Tetrachloroethane	NC	--	NC	5.50E-08	NC	--	NC	--	NC
4-Methyl-2-pentanone	6.63E-02	9.40E-07	6.23E-08	--	NC	--	NC	--	NC
Benzene	8.92E-01	1.20E-05	1.07E-05	2.70E-05	2.41E-05	7.90E-06	7.04E-06	3.00E-07	2.67E-07
Chlorobenzene	2.65E-01	9.70E-06	2.57E-06	2.40E-05	6.37E-06	2.90E-05	7.70E-06	--	NC
Chloroform	1.76E+01	--	NC	2.60E-06	4.58E-05	--	NC	4.30E-07	7.58E-06
Ethylbenzene	5.30E-03	--	NC	1.70E-05	9.01E-08	--	NC	--	NC
Naphthalene	1.77E+00	7.00E-07	1.24E-06	1.50E-06	2.65E-06	--	NC	--	NC
Tetrachloroethene	1.33E-02	1.70E-06	2.26E-08	--	NC	--	NC	--	NC
Toluene	1.33E-02	3.20E-05	4.25E-07	1.20E-06	1.60E-08	--	NC	--	NC
Trichloroethene	NC	1.60E-06	NC	--	NC	1.90E-06	NC	--	NC
Vinyl chloride	5.30E-02	4.60E-06	2.44E-07	--	NC	7.10E-05	3.77E-06	--	NC
	Total HI:		**1.53E-05**		**7.90E-05**		**1.85E-05**		**7.85E-06**

Notes:
-- Not a constituent of potential concern in this area/medium.
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated.
(a) - Outdoor air concentration calculated from average groundwater concentration in this area.

SAUGET AREA 1 - EE/CA AND RI/FS
RME

Receptors Evaluated	
Receptor 3:	RME Recreational Teen

ASSUMPTIONS FOR RECREATIONAL TEEN - RME INCIDENTIAL INGESTION AND DERMAL CONTACT SEDIMENT		Assumed Value	Units	Calculated Value
Sediment Ingestion Rate	RME Recreational Teen	100	(mg soil/day)	
Sediment on Skin	RME Recreational Teen	1	(mg/cm^2)	
Skin Exposed	RME Recreational Teen	2029	(cm^2)	
Body Weight	RME Recreational Teen	47	(kg)	
Exposure Frequency	RME Recreational Teen	26	(days)/365(days) =	7.12E-02
Exposure Duration (cancer)	RME Recreational Teen	11	(years)/70(years) =	1.57E-01
Exposure Duration (noncancer)	RME Recreational Teen	11	(yrs)/11(yrs) =	1.00E+00
Lifetime		70	(years)	
Unit Conversion Factor		1.00E-06	(kg/mg)	

22-Dec-00

P-114

SAUGET AREA 1 - EE/CA AND RI/FS
RME
POTENTIAL CARCINOGENIC RISK
INCIDENTIAL INGESTION AND DERMAL CONTACT
SEDIMENT
RECREATIONAL TEEN - RME

Constituent	Concentration in Sediment (mg/kg)	Oral - Soil Absorption Adjustment Factor	Dermal - Soil Absorption Adjustment Factor	Oral Cancer Slope Factor (mg/kg-day)⁻¹	ADDing RME Recreational Teen (mg/kg-day)	Lifetime Average Daily Dose-Ing. (mg/kg-day)	ADDder RME Recreational Teen (mg/kg-day)	Lifetime Average Daily Dose-Der. (mg/kg-day)	Excess Lifetime Cancer Risk - Ingestion	Excess Lifetime Cancer Risk - Dermal Contact	Total Excess Lifetime Cancer Risk
Arsenic	1.79E+01	0.3	0.001	1.50E+00	1.28E-07	1.28E-07	8.66E-09	8.66E-09	1.92E-07	1.30E-08	2.05E-07
Total PCBs	1.24E+00	0.83	0.04	2.00E+00	2.45E-08	2.45E-08	2.40E-08	2.40E-08	4.90E-08	4.79E-08	9.70E-08
								Total:	2.41E-07	6.09E-08	3.02E-07

SAUGET AREA 1 - EE/CA AND RI/FS
RME
NONCARCINOGENIC HAZARD INDEX
INCIDENTIAL INGESTION AND DERMAL CONTACT
SEDIMENT
RECREATIONAL TEEN - RME

Constituent	Concentration in Sediment (mg/kg)	Oral - Soil Absorption Adjustment Factor	Dermal - Soil Absorption Adjustment Factor	Oral Reference Dose (mg/kg-day)	ADDing RME Recreational Teen (mg/kg-day)	Chronic Average Daily Dose-Ing. (mg/kg-day)	ADDder RME Recreational Teen (mg/kg-day)	Chronic Average Daily Dose-Der. (mg/kg-day)	Hazard Index - Ingestion	Hazard Index - Dermal Contact	Total Hazard Index
Arsenic	1.79E+01	0.3	0.001	3.00E-04	8.15E-07	8.15E-07	5.51E-08	5.51E-08	2.72E-03	1.84E-04	2.90E-03
Total PCBs	1.24E+00	0.83	0.04	2.00E-05	1.56E-07	1.56E-07	1.53E-07	1.53E-07	7.80E-03	7.63E-03	1.54E-02
								Total:	1.05E-02	7.81E-03	1.83E-02

P-116

SAUGET AREA 1 - EE/CA AND RI/FS
MLE

Receptors Evaluated	
Receptor 3:	MLE Recreational Teen

ASSUMPTIONS FOR RECREATIONAL TEEN - MLE INCIDENTIAL INGESTION AND DERMAL CONTACT SEDIMENT		Assumed Value	Units	Calculated Value
Sediment Ingestion Rate	MLE Recreational Teen	50	(mg soil/day)	
Sediment on Skin	MLE Recreational Teen	1	(mg/cm^2)	
Skin Exposed	MLE Recreational Teen	2029	(cm^2)	
Body Weight	MLE Recreational Teen	47	(kg)	
Exposure Frequency	MLE Recreational Teen	13	(days)/365(days) =	3.56E-02
Exposure Duration (cancer)	MLE Recreational Teen	11	(years)/70(years) =	1.57E-01
Exposure Duration (noncancer)	MLE Recreational Teen	11	(yrs)/11(yrs) =	1.00E+00
Lifetime		70	(years)	
Unit Conversion Factor		1.00E-06	(kg/mg)	

22-Dec-00

P-117

SAUGET AREA 1 - EE/CA AND RI/FS
MLE
POTENTIAL CARCINOGENIC RISK
INCIDENTIAL INGESTION AND DERMAL CONTACT
SEDIMENT
RECREATIONAL TEEN - MLE

Constituent	Concentration in Sediment (mg/kg)	Oral - Soil Absorption Adjustment Factor	Dermal - Soil Absorption Adjustment Factor	Oral Cancer Slope Factor (mg/kg-day)⁻¹	ADDing MLE Recreational Teen (mg/kg-day)	Lifetime Average Daily Dose-Ing. (mg/kg-day)	ADDder MLE Recreational Teen (mg/kg-day)	Lifetime Average Daily Dose-Der. (mg/kg-day)	Excess Lifetime Cancer Risk - Ingestion	Excess Lifetime Cancer Risk - Dermal Contact	Total Excess Lifetime Cancer Risk
Arsenic	1.48E+01	0.3	0.001	1.50E+00	2.64E-08	2.64E-08	3.58E-09	3.58E-09	3.97E-08	5.36E-09	4.50E-08
Total PCBs	4.02E-01	0.83	0.04	2.00E+00	1.99E-09	1.99E-09	3.89E-09	3.89E-09	3.97E-09	7.77E-09	1.17E-08
								Total:	4.36E-08	1.31E-08	5.68E-08

P-118

SAUGET AREA 1 - EE/CA AND RI/FS
MLE
NONCARCINOGENIC HAZARD INDEX
INCIDENTIAL INGESTION AND DERMAL CONTACT
SEDIMENT
RECREATIONAL TEEN - MLE

Constituent	Concentration in Sediment (mg/kg)	Oral - Soil Absorption Adjustment Factor	Dermal - Soil Absorption Adjustment Factor	Oral Reference Dose (mg/kg-day)	ADDing MLE Recreational Teen (mg/kg-day)	Chronic Average Daily Dose-Ing. (mg/kg-day)	ADDder MLE Recreational Teen (mg/kg-day)	Chronic Average Daily Dose-Der. (mg/kg-day)	Hazard Index - Ingestion	Hazard Index - Dermal Contact	Total Hazard Index
Arsenic	1.48E+01	0.3	0.001	3.00E-04	1.68E-07	1.68E-07	2.28E-08	2.28E-08	5.61E-04	7.59E-05	6.37E-04
Total PCBs	4.02E-01	0.83	0.04	2.00E-05	1.26E-08	1.26E-08	2.47E-08	2.47E-08	6.32E-04	1.24E-03	1.87E-03
								Total:	1.19E-03	1.31E-03	2.50E-03

P-119

SAUGET AREA 1 - EE/CA AND RI/FS
RME

Receptors Evaluated	
Receptor 3:	RME Fisher

ASSUMPTIONS FOR RECREATIONAL FISHER - RME INCIDENTIAL INGESTION AND DERMAL CONTACT SEDIMENT		Assumed Value	Units	Calculated Value
Sediment Ingestion Rate	RME Fisher	100	(mg soil/day)	
Sediment on Skin	RME Fisher	1	(mg/cm^2)	
Skin Exposed	RME Fisher	4500	(cm^2)	
Body Weight	RME Fisher	70	(kg)	
Exposure Frequency	RME Fisher	22	(days)/365(days) =	6.03E-02
Exposure Duration (cancer)	RME Fisher	30	(years)/70(years) =	4.29E-01
Exposure Duration (noncancer)	RME Fisher	30	(yrs)/30(yrs) =	1.00E+00
Lifetime		70	(years)	
Unit Conversion Factor		1.00E-06	(kg/mg)	

22-Dec-00

P-120

SAUGET AREA 1 - EE/CA AND RI/FS
RME
POTENTIAL CARCINOGENIC RISK
INCIDENTIAL INGESTION AND DERMAL CONTACT
SEDIMENT
RECREATIONAL FISHER - RME

Constituent	Concentration in Sediment (mg/kg)	Oral - Soil Absorption Adjustment Factor	Dermal - Soil Absorption Adjustment Factor	Oral Cancer Slope Factor (mg/kg-day)$^{-1}$	ADDing RME Fisher (mg/kg-day)	Lifetime Average Daily Dose-Ing. (mg/kg-day)	ADDder RME Fisher (mg/kg-day)	Lifetime Average Daily Dose-Der. (mg/kg-day)	Excess Lifetime Cancer Risk - Ingestion	Excess Lifetime Cancer Risk - Dermal Contact	Total Excess Lifetime Cancer Risk
Arsenic	1.79E+01	0.3	0.001	1.50E+00	1.98E-07	1.98E-07	2.98E-08	2.98E-08	2.98E-07	4.47E-08	3.42E-07
Total PCBs	1.24E+00	0.83	0.04	2.00E+00	3.80E-08	3.80E-08	8.24E-08	8.24E-08	7.60E-08	1.65E-07	2.41E-07
								Total:	3.74E-07	2.09E-07	5.83E-07

SAUGET AREA 1 - EE/CA AND RI/FS
RME
NONCARCINOGENIC HAZARD INDEX
INCIDENTIAL INGESTION AND DERMAL CONTACT
SEDIMENT
RECREATIONAL FISHER - RME

Constituent	Concentration in Sediment (mg/kg)	Oral - Soil Absorption Adjustment Factor	Dermal - Soil Absorption Adjustment Factor	Oral Reference Dose (mg/kg-day)	ADDing RME Fisher (mg/kg-day)	Chronic Average Daily Dose-Ing. (mg/kg-day)	ADDder RME Fisher (mg/kg-day)	Chronic Average Daily Dose-Der. (mg/kg-day)	Hazard Index - Ingestion	Hazard Index - Dermal Contact	Total Hazard Index
Arsenic	1.79E+01	0.3	0.001	3.00E-04	4.63E-07	4.63E-07	6.95E-08	6.95E-08	1.54E-03	2.32E-04	1.78E-03
Total PCBs	1.24E+00	0.83	0.04	2.00E-05	8.86E-08	8.86E-08	1.92E-07	1.92E-07	4.43E-03	9.61E-03	1.40E-02
								Total:	5.97E-03	9.84E-03	1.58E-02

P-122

SAUGET AREA 1 - EE/CA AND RI/FS
RME

Receptors Evaluated:	
Receptor 3:	RME Fisher

ASSUMPTIONS FOR RECREATIONAL FISHER - RME INGESTION OF FISH		Assumed Value	Units	Calculated Value
Fish Ingestion Rate	RME Fisher	0.008	(kg fish/day)	
Body Weight	RME Fisher	70	(kg)	
Exposure Frequency	RME Fisher	365	(days)/ 365 (days) =	1.00E+00
Exposure Duration (cancer)	RME Fisher	30	(yrs)/ 70 (yrs) =	4.29E-01
Exposure Duration (noncancer)	RME Fisher	30	(yrs)/ 30 (yrs) =	1.00E+00
Lifetime		70	(years)	

P-123

SAUGET AREA 1 - EE/CA AND RI/FS
RME

POTENTIAL CARCINOGENIC RISK
INGESTION OF FISH
RECREATIONAL FISHER - RME

Constituent	Fish Fillet Concentration (mg/kg)	Oral - Diet Absorption Adjustment Factor	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	ADDing RME Fisher (mg/kg-day)	Lifetime Average Daily Dose (mg/kg-day)	Excess Lifetime Cancer Risk
Arsenic	4.50E-01	1	1.50E+00	2.20E-05	2.20E-05	3.31E-05

SAUGET AREA 1 - EE/CA AND RI/FS
RME

POTENTIAL HAZARD INDEX
INGESTION OF FISH
RECREATIONAL FISHER - RME

Constituent	Fish Fillet Concentration (mg/kg)	Oral - Diet Absorption Adjustment Factor	Oral Reference Dose (mg/kg-day)	ADDing RME Fisher (mg/kg-day)	Lifetime Average Daily Dose (mg/kg-day)	Excess Lifetime Hazard Index
Arsenic	4.50E-01	1	3.00E-04	5.14E-05	5.14E-05	1.71E-01

P-125

SAUGET AREA 1 - EE/CA AND RI/FS
MLE

Receptors Evaluated	
Receptor 3:	MLE Fisher

ASSUMPTIONS FOR RECREATIONAL FISHER - MLE INCIDENTIAL INGESTION AND DERMAL CONTACT SEDIMENT		Assumed Value	Units	Calculated Value
Sediment Ingestion Rate	MLE Fisher	50	(mg soil/day)	
Sediment on Skin	MLE Fisher	1	(mg/cm^2)	
Skin Exposed	MLE Fisher	4500	(cm^2)	
Body Weight	MLE Fisher	70	(kg)	
Exposure Frequency	MLE Fisher	3	(days)/365(days) =	8.22E-03
Exposure Duration (cancer)	MLE Fisher	9	(years)/70(years) =	1.29E-01
Exposure Duration (noncancer)	MLE Fisher	9	(yrs)/9(yrs) =	1.00E+00
Lifetime		70	(years)	
Unit Conversion Factor		1.00E-06	(kg/mg)	

22-Dec-00

P-126

SAUGET AREA 1 - EE/CA AND RI/FS
MLE
POTENTIAL CARCINOGENIC RISK
INCIDENTIAL INGESTION AND DERMAL CONTACT
SEDIMENT
RECREATIONAL FISHER - MLE

Constituent	Concentration in Sediment (mg/kg)	Oral - Soil Absorption Adjustment Factor	Dermal - Soil Absorption Adjustment Factor	Oral Cancer Slope Factor (mg/kg-day)⁻¹	ADDing MLE Fisher (mg/kg-day)	Lifetime Average Daily Dose-Ing. (mg/kg-day)	ADDder MLE Fisher (mg/kg-day)	Lifetime Average Daily Dose-Der. (mg/kg-day)	Excess Lifetime Cancer Risk - Ingestion	Excess Lifetime Cancer Risk - Dermal Contact	Total Excess Lifetime Cancer Risk
Arsenic	1.48E+01	0.3	0.001	1.50E+00	3.35E-09	3.35E-09	1.01E-09	1.01E-09	5.03E-09	1.51E-09	6.54E-09
Total PCBs	4.02E-01	0.83	0.04	2.00E+00	2.52E-10	2.52E-10	1.09E-09	1.09E-09	5.04E-10	2.18E-09	2.69E-09
								Total:	5.53E-09	3.69E-09	9.22E-09

P-127

SAUGET AREA 1 - EE/CA AND RI/FS
MLE
NONCARCINOGENIC HAZARD INDEX
INCIDENTIAL INGESTION AND DERMAL CONTACT
SEDIMENT
RECREATIONAL FISHER - MLE

Constituent	Concentration in Sediment (mg/kg)	Oral - Soil Absorption Adjustment Factor	Dermal - Soil Absorption Adjustment Factor	Oral Reference Dose (mg/kg-day)	ADDing MLE Fisher (mg/kg-day)	Chronic Average Daily Dose-Ing. (mg/kg-day)	ADDder MLE Fisher (mg/kg-day)	Chronic Average Daily Dose-Der. (mg/kg-day)	Hazard Index - Ingestion	Hazard Index - Dermal Contact	Total Hazard Index
Arsenic	1.48E+01	0.3	0.001	3.00E-04	2.61E-08	2.61E-08	7.82E-09	7.82E-09	8.69E-05	2.61E-05	1.13E-04
Total PCBs	4.02E-01	0.83	0.04	2.00E-05	1.96E-09	1.96E-09	8.50E-09	8.50E-09	9.79E-05	4.25E-04	5.23E-04
								Total:	1.85E-04	4.51E-04	6.36E-04

P-128

SAUGET AREA 1 - EE/CA AND RI/FS
MLE

Receptors Evaluated:	
Receptor 3:	MLE Fisher

ASSUMPTIONS FOR RECREATIONAL FISHER -MLE INGESTION OF FISH		Assumed Value	Units	Calculated Value
Fish Ingestion Rate	MLE Fisher	0.001	(kg fish/day)	
Body Weight	MLE Fisher	70	(kg)	
Exposure Frequency	MLE Fisher	365	(days)/ 365 (days) =	1.00E+00
Exposure Duration (cancer)	MLE Fisher	9	(yrs)/ 70 (yrs) =	1.29E-01
Exposure Duration (noncancer)	MLE Fisher	9	(yrs)/ 9 (yrs) =	1.00E+00
Lifetime		70	(years)	

P-129

SAUGET AREA 1 - EE/CA AND RI/FS
MLE

POTENTIAL CARCINOGENIC RISK
INGESTION OF FISH
RECREATIONAL FISHER -MLE

Constituent	Fish Fillet Concentration (mg/kg)	Oral - Diet Absorption Adjustment Factor	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	ADDing MLE Fisher (mg/kg-day)	Lifetime Average Daily Dose (mg/kg-day)	Excess Lifetime Cancer Risk
Arsenic	4.50E-01	1	1.50E+00	8.27E-07	8.27E-07	1.24E-06

SAUGET AREA 1 - EE/CA AND RI/FS
MLE

POTENTIAL HAZARD INDEX
INGESTION OF FISH
RECREATIONAL FISHER -MLE

Constituent	Fish Fillet Concentration (mg/kg)	Oral - Diet Absorption Adjustment Factor	Oral Reference Dose (mg/kg-day)	ADDing MLE Fisher (mg/kg-day)	Lifetime Average Daily Dose (mg/kg-day)	Excess Lifetime Hazard Index
Arsenic	4.50E-01	1	3.00E-04	6.43E-06	6.43E-06	2.14E-02

P-131

SAUGET AREA 1 - EE/CA AND RI/FS
RME

Receptors Evaluated	
Receptor 1:	RME Young Child
Receptor 3:	RME Adult

ASSUMPTIONS FOR RESIDENTIAL RECEPTORS - RME INCIDENTIAL INGESTION AND DERMAL CONTACT SURFACE SOIL		Assumed Value	Units	Calculated Value
Soil Ingestion Rate	RME Young Child	200	(mg soil/day)	
Soil Ingestion Rate	RME Adult	100	(mg soil/day)	
Soil on Skin	RME Young Child	0.06	(mg/cm^2)	
Soil on Skin	RME Adult	0.12	(mg/cm^2)	
Skin Exposed	RME Young Child	2058	(cm^2)	
Skin Exposed	RME Adult	5729	(cm^2)	
Body Weight	RME Young Child	15	(kg)	
Body Weight	RME Adult	70	(kg)	
Exposure Frequency	RME Young Child	266	(days)/365(days) =	7.29E-01
Exposure Frequency	RME Adult	266	(days)/365(days) =	7.29E-01
Exposure Duration (cancer)	RME Young Child	6	(years)/70(years) =	8.57E-02
Exposure Duration (cancer)	RME Adult	24	(years)/70(years) =	3.43E-01
Exposure Duration (noncancer)	RME Young Child	6	(yrs)/6(yrs) =	1.00E+00
Lifetime		70	(years)	
Unit Conversion Factor		1.00E-06	(kg/mg)	

22-Dec-00

P-132

SAUGET AREA 1 - EE/CA AND RI/FS
RME
POTENTIAL CARCINOGENIC RISK
INCIDENTIAL INGESTION AND DERMAL CONTACT
SURFACE SOIL
RESIDENTIAL RECEPTOR CHILD AND ADULT

Constituent	Unit Concentration in Soil (mg/kg soil)	Oral - Soil Absorption Adjustment Factor	Dermal - Soil Absorption Adjustment Factor	Oral Cancer Slope Factor (mg/kg-day)⁻¹	ADDing Young Child (mg/kg-day)	ADDing RME Adult (mg/kg-day)	Lifetime Average Daily Dose-Ing. (mg/kg-day)	ADDder Young Child (mg/kg-day)	ADDder RME Adult (mg/kg-day)	Lifetime Average Daily Dose-Der. (mg/kg-day)	Excess Lifetime Cancer Risk - Ingestion	Excess Lifetime Cancer Risk - Dermal Contact	Total Excess Lifetime Cancer Risk
Arsenic	1.00E+00	0.3	0.001	1.50E+00	2.50E-07	1.07E-07	3.57E-07	5.14E-10	2.45E-09	2.97E-09	5.35E-07	4.45E-09	5.40E-07
Benzo(a)anthracene	1.00E+00	0.29	0.02	7.30E-01	2.42E-07	1.04E-07	3.45E-07	1.03E-08	4.91E-08	5.94E-08	2.52E-07	4.33E-08	2.95E-07
Benzo(a)pyrene	1.00E+00	0.29	0.02	7.30E+00	2.42E-07	1.04E-07	3.45E-07	1.03E-08	4.91E-08	5.94E-08	2.52E-06	4.33E-07	2.95E-06
Benzo(b)fluoranthene	1.00E+00	0.29	0.02	7.30E-01	2.42E-07	1.04E-07	3.45E-07	1.03E-08	4.91E-08	5.94E-08	2.52E-07	4.33E-08	2.95E-07
Dibenzo(a,h)anthracene	1.00E+00	0.29	0.02	7.30E+00	2.42E-07	1.04E-07	3.45E-07	1.03E-08	4.91E-08	5.94E-08	2.52E-06	4.33E-07	2.95E-06
Dieldrin	1.00E+00	1	0.01	1.60E+01	8.33E-07	3.57E-07	1.19E-06	5.14E-09	2.45E-08	2.97E-08	1.90E-05	4.75E-07	1.95E-05
Indeno(1,2,3-cd)pyrene	1.00E+00	0.29	0.02	7.30E-01	2.42E-07	1.04E-07	3.45E-07	1.03E-08	4.91E-08	5.94E-08	2.52E-07	4.33E-08	2.95E-07

22-Dec-00

P-133

TABLE
POTENTIAL CARCINOGENIC RISK - RME
INCIDENTIAL INGESTION AND DERMAL CONTACT
SURFACE SOIL
RESIDENTIAL RECEPTORS - RME
SAUGET AREA 1 - EE/CA AND RI/FS

Constituent	Reference Risk (per mg/kg)	Fill Area N		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7	
		EPC (mg/kg)	Risk	EPC (mg/kg)	Risk	EPC (mg/kg)	Risk	EPC (mg/kg)	Risk	EPC (mg/kg)	Risk	EPC (mg/kg)	Risk
Arsenic	5.40E-07	--	NC	--	NC	--	NC	--	NC	--	NC	1.50E+01	8.09E-06
Benzo(a)anthracene	2.95E-07	--	NC	--	NC	4.30E+00	1.27E-06	--	NC	4.20E+00	1.24E-06	1.90E+00	5.61E-07
Benzo(a)pyrene	2.95E-06	3.30E-01	9.74E-07	2.60E-01	7.68E-07	3.50E+00	1.03E-05	3.40E-01	1.00E-06	3.60E+00	1.06E-05	2.10E+00	6.20E-06
Benzo(b)fluoranthene	2.95E-07	--	NC	4.00E-01	1.18E-07	2.81E+00	8.30E-07	--	NC	4.40E+00	1.30E-06	2.20E+00	6.49E-07
Dibenzo(a,h)anthracene	2.95E-06	1.10E-01	3.25E-07	1.00E-01	2.95E-07	2.30E-01	6.79E-07	1.90E-01	5.61E-07	3.30E-01	9.74E-07	2.00E-01	5.90E-07
Dieldrin	1.95E-05	--	NC	--	NC	--	NC	1.00E-01	1.95E-06	--	NC	--	NC
Indeno(1,2,3-cd)pyrene	2.95E-07	--	NC	--	NC	9.55E-01	2.82E-07	--	NC	5.90E-01	1.74E-07	6.30E-01	1.86E-07
	Total:		**1.30E-06**		**1.18E-06**		**1.34E-05**		**3.52E-06**		**1.43E-05**		**1.63E-05**

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
NC - Not Calculated.

P-134

SAUGET AREA 1 - EE/CA AND RI/FS
RME
NONCARCINOGENIC HAZARD INDEX
INCIDENTIAL INGESTION AND DERMAL CONTACT
SURFACE SOIL
RESIDENTIAL RECEPTORS - RME CHILD

Constituent	Unit Concentration in Soil (mg/kg-soil)	Oral - Soil Absorption Adjustment Factor	Dermal - Soil Absorption Adjustment Factor	Oral Reference Dose (mg/kg-day)	ADDIng Young Child (mg/kg-day)	Chronic Average Daily Dose-Ing. (mg/kg-day)	ADDder Young Child (mg/kg-day)	Chronic Average Daily Dose-Der. (mg/kg-day)	Hazard Index - Ingestion	Hazard Index - Dermal Contact	Total Hazard Index
Arsenic	1.00E+00	0.3	0.001	3.00E-04	2.92E-06	2.92E-06	6.00E-09	6.00E-09	9.72E-03	2.00E-05	9.74E-03
Benzo(a)anthracene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Benzo(a)pyrene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Benzo(b)fluoranthene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Dibenzo(a,h)anthracene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Dieldrin	1.00E+00	1	0.01	5.00E-05	9.72E-06	9.72E-06	6.00E-08	6.00E-08	1.94E-01	1.20E-03	1.96E-01
Indeno(1,2,3-cd)pyrene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC

P-135

TABLE
POTENTIAL HAZARD INDEX - RME
INCIDENTIAL INGESTION AND DERMAL CONTACT
SURFACE SOIL
RESIDENTIAL RECEPTORS - RME
SAUGET AREA 1 - EE/CA AND RI/FS

Constituent	Reference HQ (per mg/kg)	Fill Area N		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7	
		EPC (mg/kg)	HQ	EPC (mg/kg)	HQ	EPC (mg/kg)	HQ	EPC (mg/kg)	HQ	EPC (mg/kg)	HQ	EPC (mg/kg)	HQ
Arsenic	9.74E-03	--	NC	--	NC	--	NC	--	NC	--	NC	1.50E+01	1.46E-01
Benzo(a)anthracene	NC	--	NC	--	NC	4.30E+00	NC	--	NC	4.20E+00	NC	1.90E+00	NC
Benzo(a)pyrene	NC	3.30E-01	NC	2.60E-01	NC	3.50E+00	NC	3.40E-01	NC	3.60E+00	NC	2.10E+00	NC
Benzo(b)fluoranthene	NC	--	NC	4.00E-01	NC	2.81E+00	NC	--	NC	4.40E+00	NC	2.20E+00	NC
Dibenzo(a,h)anthracene	NC	1.10E-01	NC	1.00E-01	NC	2.30E-01	NC	1.90E-01	NC	3.30E-01	NC	2.00E-01	NC
Dieldrin	1.96E-01	--	NC	--	NC	--	NC	1.00E-01	1.96E-02	--	NC	--	NC
Indeno(1,2,3-cd)pyrene	NC	--	NC	--	NC	9.55E-01	NC	--	NC	5.90E-01	NC	6.30E-01	NC
Total HI:			NC		NC		NC		1.96E-02		NC		1.46E-01

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated.

SAUGET AREA 1 - EE/CA AND RI/FS
RME

Receptors Evaluated:	
Receptor 1:	RME Young Child
Receptor 3:	RME Adult

ASSUMPTIONS FOR RESIDENTIAL RECEPTORS - RME INHALATION OF OUTDOOR AIR PARTICULATES		**Assumed Value**	**Units**	**Calculated Value**
Inhalation Rate	RME Young Child	1.2	(m^3 air/hour)	
Inhalation Rate	RME Adult	1.6	(m^3 air/hour)	
Body Weight	RME Young Child	15	(kg)	
Body Weight	RME Adult	70	(kg)	
Exposure Time	RME Young Child	6	(hrs/day) =	6.00E+00
Exposure Time	RME Adult	2	(hrs/day) =	2.00E+00
Exposure Frequency	RME Young Child	266	(days)/365 (days) =	7.29E-01
Exposure Frequency	RME Adult	266	(days)/365 (days) =	7.29E-01
Exposure Duration (cancer)	RME Young Child	6	(yrs)/70(yrs) =	8.57E-02
Exposure Duration (cancer)	RME Adult	24	(yrs)/70(yrs) =	3.43E-01
Exposure Duration (noncancer)	RME Young Child	6	(yrs)/6(yrs) =	1.00E+00
Lifetime		70	(years)	

P-137

SAUGET AREA 1 - EE/CA AND RI/FS
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR PARTICULATES
RESIDENTIAL RECEPTORS - RME

Constituent	Unit Concentration In Air (mg/m³ air)	Inhalation Absorption Adjustment Factor	Inhalation Cancer Slope Factor (mg/kg-day)⁻¹	ADDinh RME Young Child (mg/kg-day)	ADDinh RME Adult (mg/kg-day)	Lifetime Average Daily Dose - Inh. (mg/kg-day)	Excess Lifetime Cancer Risk - Inhalation
Arsenic	1.00E+00	1	1.50E+01	3.00E-02	1.14E-02	4.14E-02	6.21E-01
Benzo(a)anthracene	1.00E+00	1	3.10E-01	3.00E-02	1.14E-02	4.14E-02	1.28E-02
Benzo(a)pyrene	1.00E+00	1	3.10E+00	3.00E-02	1.14E-02	4.14E-02	1.28E-01
Benzo(b)fluoranthene	1.00E+00	1	3.10E-01	3.00E-02	1.14E-02	4.14E-02	1.28E-02
Dibenzo(a,h)anthracene	1.00E+00	1	3.10E+00	3.00E-02	1.14E-02	4.14E-02	1.28E-01
Dieldrin	1.00E+00	1	1.61E+01	3.00E-02	1.14E-02	4.14E-02	6.67E-01
Indeno(1,2,3-cd)pyrene	1.00E+00	1	3.10E-01	3.00E-02	1.14E-02	4.14E-02	1.28E-02

P-138

TABLE
POTENTIAL CARCINOGENIC RISK
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR PARTICULATES
RESIDENTIAL RECEPTORS - RME

Constituent	Reference Risk (per mg/m3)	Fill Area N		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7	
		EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk
Arsenic	8.21E-01	--	NC	--	NC	--	NC	--	NC	--	NC	1.27E-08	7.86E-09
Benzo(a)anthracene	1.28E-02	--	NC	--	NC	3.63E-09	4.66E-11	--	NC	3.55E-09	4.56E-11	1.61E-09	2.06E-11
Benzo(a)pyrene	1.28E-01	4.18E-10	5.36E-11	2.20E-10	2.82E-11	2.96E-09	3.80E-10	2.87E-10	3.69E-11	3.04E-09	3.90E-10	1.77E-09	2.28E-10
Benzo(b)fluoranthene	1.28E-02	--	NC	3.38E-10	4.34E-12	2.37E-09	3.05E-11	--	NC	3.72E-09	4.77E-11	1.86E-09	2.39E-11
Dibenzo(a,h)anthracene	1.28E-01	1.39E-10	1.79E-11	8.45E-11	1.08E-11	1.94E-10	2.49E-11	1.61E-10	2.06E-11	2.79E-10	3.58E-11	1.69E-10	2.17E-11
Dieldrin	6.67E-01	--	NC	--	NC	--	NC	8.45E-11	5.63E-11	--	NC	--	NC
Indeno(1,2,3-cd)pyrene	1.28E-02	--	NC	--	NC	8.07E-10	1.04E-11	--	NC	4.99E-10	6.40E-12	5.32E-10	6.83E-12
	Total:		7.15E-11		4.34E-11		4.92E-10		1.14E-10		5.26E-10		8.16E-09

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
NC - Not Calculated.

P-139

SAUGET AREA 1 - EE/CA AND RI/FS
NONCARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR PARTICULATES
RESIDENTIAL RECEPTORS - RME

Constituent	Unit Concentration In Air (mg/m^3 air)	Inhalation Absorption Adjustment Factor	Inhalation Reference Dose RME (mg/kg-day)	ADDinh Young Child (mg/kg-day)	Chronic Average Daily Dose-inh (mg/kg-day)	Hazard Index - Inhalation
Arsenic	1.00E+00	NA	NA	NA	NA	NC
Benzo(a)anthracene	1.00E+00	NA	NA	NA	NA	NC
Benzo(a)pyrene	1.00E+00	NA	NA	NA	NA	NC
Benzo(b)fluoranthene	1.00E+00	NA	NA	NA	NA	NC
Dibenzo(a,h)anthracene	1.00E+00	NA	NA	NA	NA	NC
Dieldrin	1.00E+00	NA	NA	NA	NA	NC
Indeno(1,2,3-cd)pyrene	1.00E+00	NA	NA	NA	NA	NC

P-140

SAUGET AREA 1 - EE/CA AND RI/FS
RME

Receptor Evaluated:	
1:	RME Young Child
2:	RME Adult

Assumptions for Carcinogenic Assessment Risk by Ingestion of Locally Grown Produce	Assumed Value	Units	Calculated Value
Crop Consumption Rate (Young Child)	15	g/day	
Body Weight (Young Child)	15	(kg)	
Exposure Frequency (Young Child)	365	(days)/ 365 (days) =	1.00E+00
Exposure Duration (Young Child) (cancer)	6	(yrs)/ 70(yrs) =	8.57E-02
Exposure Duration (Young Child) (noncancer)	6	(yrs)/ 6(yrs) =	1.00E+00
Crop Consumption Rate (Adult)	454	g/day	
Body Weight (Adult)	70	(kg)	
Exposure Frequency (Adult)	365	(days)/ 365 (days) =	1.00E+00
Exposure Duration (Adult) (cancer)	24	(yrs)/ 70(yrs) =	3.43E-01
Lifetime	70	(years)	
Unit Conversion Factor	0.001	(kg/g)	

SAUGET AREA 1 - EE/CA AND RI/FS
RME
Carcinogenic Assessment
Risk by Ingestion of Locally Grown Produce
Residential Adult and Child

Constituent	Unit Produce Concentration (mg/kg produce)	Oral Absorption Adjustment Factor	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	ADD Young Child (mg/kg-day)	ADD RME Adult (mg/kg-day)	Lifeteme Average Daily Dose - Ing. of all Crop Types (mg/kg-day)	Excess Lifetime Cancer Risk
Arsenic	1.00E+00	1	1.50E+00	8.57E-05	2.22E-03	2.31E-03	3.46E-03

P-142

TABLE
POTENTIAL CARCINOGENIC RISK - RME
INGESTION OF PRODUCE
RESIDENTIAL ADULT AND CHILD
SAUGET AREA 1 - EE/CA AND RI/FS

Constituent	Reference Risk All Produce (per mg/kg)	Transect 7 Above Ground (a) EPC (mg/kg)	Transect 7 Above Ground (a) Risk	Transect 7 Below Ground (b) EPC (mg/kg)	Transect 7 Below Ground (b) Risk	Transect 7 Total
Arsenic	3.46E-03	1.42E-02	3.40E-05	1.80E-02	1.93E-05	5.33E-05
Total:			**3.40E-05**		**1.93E-05**	**5.33E-05**

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration (mg/kg produce).
NC - Not Calculated.
(a) - 69% of total vegetable ingestion is of above ground vegetables. Therefore, risk is the total produce concentration (mg/kg) x reference risk x 69%.
(b) - 31% of total vegetable ingestion is of below ground vegetables. Therefore, risk is the total produce concentration (mg/kg) x reference risk x 31%.

P-143

SAUGET AREA 1 - EE/CA AND RI/FS
RME
Noncarcinogenic Assessment
Risk by Ingestion of Locally Grown Produce
Residential Child

Constituent	Unit Produce Concentration (mg/kg produce)	Oral Absorption Adjustment Factor	Oral Reference Dose (mg/kg-day)	Chronic Average Daily Dose - Ing. of all Crop Types (mg/kg-day)	Hazard Index
Arsenic	1.00E+00	1	3.00E-04	1.00E-03	3.33E+00

P-144

TABLE
POTENTIAL HAZARD INDEX - RME
INGESTION OF PRODUCE
RESIDENTIAL CHILD
SAUGET AREA 1 - EE/CA AND RI/FS

Constituent	Reference HQ (All produce) (per mg/kg)	Transect 7				
		Above Ground (a)		Below Ground (b)		Total
		EPC (mg/kg)	HQ	EPC (mg/kg)	HQ	
Arsenic	3.33E+00	1.42E-02	3.27E-02	1.80E-02	1.86E-02	5.13E-02
	Total HI:		**3.27E-02**		**1.86E-02**	**5.13E-02**

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration (mg/kg produce).
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated.
(a) - 69% of total vegetable ingestion is of above ground vegetables. Therefore, risk is the total produce concentration (mg/kg) x reference risk x 69%.
(b) - 31% of total vegetable ingestion is of below ground vegetables. Therefore, risk is the total produce concentration (mg/kg) x reference risk x 31%.

SAUGET AREA 1 - EE/CA AND RI/FS
MLE

Receptors Evaluated	
Receptor 1:	MLE Young Child
Receptor 3:	MLE Adult

ASSUMPTIONS FOR RESIDENTIAL RECEPTORS - MLE INCIDENTIAL INGESTION AND DERMAL CONTACT SURFACE SOIL

		Assumed Value	Units	Calculated Value
Soil Ingestion Rate	MLE Young Child	100	(mg soil/day)	
Soil Ingestion Rate	MLE Adult	50	(mg soil/day)	
Soil on Skin	MLE Young Child	0.06	(mg/cm^2)	
Soil on Skin	MLE Adult	0.12	(mg/cm^2)	
Skin Exposed	MLE Young Child	2058	(cm^2)	
Skin Exposed	MLE Adult	5729	(cm^2)	
Body Weight	MLE Young Child	15	(kg)	
Body Weight	MLE Adult	70	(kg)	
Exposure Frequency	MLE Young Child	178	(days)/365(days) =	4.88E-01
Exposure Frequency	MLE Adult	178	(days)/365(days) =	4.88E-01
Exposure Duration (cancer)	MLE Young Child	2	(years)/70(years) =	2.86E-02
Exposure Duration (cancer)	MLE Adult	7	(years)/70(years) =	1.00E-01
Exposure Duration (noncancer)	MLE Young Child	2	(yrs)/2(yrs) =	1.00E+00
Lifetime		70	(years)	
Unit Conversion Factor		1.00E-06	(kg/mg)	

22-Dec-00

P-146

.UGET AREA 1 - EE/CA AND RI/FS
.E
TENTIAL CARCINOGENIC RISK
:IDENTIAL INGESTION AND DERMAL CONTACT
RFACE SOIL
SIDENTIAL RECEPTOR CHILD AND ADULT

nstituent	Unit Concentration in Soil (mg/kg soil)	Oral - Soil Absorption Adjustment Factor	Dermal - Soil Absorption Adjustment Factor	Oral Cancer Slope Factor (mg/kg-day)$^{-1}$	ADDing Young Child (mg/kg-day)	ADDing MLE Adult (mg/kg-day)	Lifetime Average Daily Dose-Ing. (mg/kg-day)	ADDder Young Child (mg/kg-day)	ADDder MLE Adult (mg/kg-day)	Lifetime Average Daily Dose-Der. (mg/kg-day)	Excess Lifetime Cancer Risk - Ingestion	Excess Lifetime Cancer Risk - Dermal Contact	Total Excess Lifetime Cancer Risk
,enic	1.00E+00	0.3	0.001	1.50E+00	2.79E-08	1.05E-08	3.83E-08	1.15E-10	4.79E-10	5.94E-10	5.75E-08	8.90E-10	5.84E-08
ɿzo(a)anthracene	1.00E+00	0.29	0.02	7.30E-01	2.69E-08	1.01E-08	3.70E-08	2.29E-09	9.58E-09	1.19E-08	2.70E-08	8.67E-09	3.57E-08
ɿzo(a)pyrene	1.00E+00	0.29	0.02	7.30E+00	2.69E-08	1.01E-08	3.70E-08	2.29E-09	9.58E-09	1.19E-08	2.70E-07	8.67E-08	3.57E-07
ɿzo(b)fluoranthene	1.00E+00	0.29	0.02	7.30E-01	2.69E-08	1.01E-08	3.70E-08	2.29E-09	9.58E-09	1.19E-08	2.70E-08	8.67E-09	3.57E-08
,enzo(a,h)anthracene	1.00E+00	0.29	0.02	7.30E+00	2.69E-08	1.01E-08	3.70E-08	2.29E-09	9.58E-09	1.19E-08	2.70E-07	8.67E-08	3.57E-07
ıldrin	1.00E+00	1	0.01	1.60E+01	9.29E-08	3.48E-08	1.28E-07	1.15E-09	4.79E-09	5.94E-09	2.04E-06	9.50E-08	2.14E-06
eno(1,2,3-cd)pyrene	1.00E+00	0.29	0.02	7.30E-01	2.69E-08	1.01E-08	3.70E-08	2.29E-09	9.58E-09	1.19E-08	2.70E-08	8.67E-09	3.57E-08

22-Dec-00

P-147

TABLE
POTENTIAL CARCINOGENIC RISK - MLE
INCIDENTIAL INGESTION AND DERMAL CONTACT
SURFACE SOIL
RESIDENTIAL RECEPTORS - MLE
SAUGET AREA 1 - EE/CA AND RI/FS

	Reference	Fill Area N		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7	
Constituent	Risk (per mg/kg)	EPC (mg/kg)	Risk	EPC (mg/kg)	Risk	EPC (mg/kg)	Risk	EPC (mg/kg)	Risk	EPC (mg/kg)	Risk	EPC (mg/kg)	Risk
Arsenic	5.84E-08	--	NC	--	NC	--	NC	--	NC	--	NC	9.99E+00	5.83E-07
Benzo(a)anthracene	3.57E-08	--	NC	--	NC	7.00E-01	2.50E-08	--	NC	6.06E-01	2.16E-08	3.42E-01	1.22E-08
Benzo(a)pyrene	3.57E-07	1.87E-01	6.68E-08	1.37E-01	4.89E-08	5.90E-01	2.11E-07	1.38E-01	4.93E-08	5.04E-01	1.80E-07	3.74E-01	1.34E-07
Benzo(b)fluoranthene	3.57E-08	--	NC	1.60E-01	5.71E-09	6.00E-01	2.14E-08	--	NC	6.34E-01	2.26E-08	4.06E-01	1.45E-08
Dibenzo(a,h)anthracene	3.57E-07	7.25E-02	2.59E-08	7.00E-02	2.50E-08	1.30E-01	4.64E-08	9.86E-02	3.52E-08	1.18E-01	4.21E-08	1.03E-01	3.68E-08
Dieldrin	2.14E-06	--	NC	--	NC	--	NC	1.58E-02	3.38E-08	--	NC	--	NC
Indeno(1,2,3-cd)pyrene	3.57E-08	--	NC	--	NC	3.60E-01	1.29E-08	--	NC	2.20E-01	7.86E-09	2.40E-01	8.57E-09
	Total:		9.27E-08		7.96E-08		3.16E-07		1.18E-07		2.74E-07		7.89E-07

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
NC - Not Calculated.

P-148

SAUGET AREA 1 - EE/CA AND RI/FS
MLE
NONCARCINOGENIC HAZARD INDEX
INCIDENTIAL INGESTION AND DERMAL CONTACT
SURFACE SOIL
RESIDENTIAL RECEPTORS - MLE CHILD

Constituent	Unit Concentration In Soil (mg/kg-soil)	Oral - Soil Absorption Adjustment Factor	Dermal - Soil Absorption Adjustment Factor	Oral Reference Dose (mg/kg-day)	ADDing Young Child (mg/kg-day)	Chronic Average Daily Dose-Ing. (mg/kg-day)	ADDder Young Child (mg/kg-day)	Chronic Average Daily Dose-Der. (mg/kg-day)	Hazard Index - Ingestion	Hazard Index - Dermal Contact	Total Hazard Index
Arsenic	1.00E+00	0.3	0.001	3.00E-04	9.75E-07	9.75E-07	4.01E-09	4.01E-09	3.25E-03	1.34E-05	3.26E-03
Benzo(a)anthracene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Benzo(a)pyrene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Benzo(b)fluoranthene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Dibenzo(a,h)anthracene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC
Dieldrin	1.00E+00	1	0.01	5.00E-05	3.25E-06	3.25E-06	4.01E-08	4.01E-08	6.50E-02	8.03E-04	6.58E-02
Indeno(1,2,3-cd)pyrene	1.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC

P-149

TABLE
POTENTIAL HAZARD INDEX - MLE
INCIDENTIAL INGESTION AND DERMAL CONTACT
SURFACE SOIL
RESIDENTIAL RECEPTORS - MLE
SAUGET AREA 1 - EE/CA AND RI/FS

Constituent	Reference HQ (per mg/kg)	Fill Area N EPC (mg/kg)	Fill Area N HQ	Transect 3 EPC (mg/kg)	Transect 3 HQ	Transect 4 EPC (mg/kg)	Transect 4 HQ	Transect 5 EPC (mg/kg)	Transect 5 HQ	Transect 6 EPC (mg/kg)	Transect 6 HQ	Transect 7 EPC (mg/kg)	Transect 7 HQ
Arsenic	3.26E-03	--	NC	--	NC	--	NC	--	NC	--	NC	9.99E+00	3.26E-02
Benzo(a)anthracene	NC	--	NC	--	NC	7.00E-01	NC	--	NC	6.06E-01	NC	3.42E-01	NC
Benzo(a)pyrene	NC	1.87E-01	NC	1.37E-01	NC	5.90E-01	NC	1.38E-01	NC	5.04E-01	NC	3.74E-01	NC
Benzo(b)fluoranthene	NC	--	NC	1.60E-01	NC	6.00E-01	NC	--	NC	6.34E-01	NC	4.06E-01	NC
Dibenzo(a,h)anthracene	NC	7.25E-02	NC	7.00E-02	NC	1.30E-01	NC	9.86E-02	NC	1.18E-01	NC	1.03E-01	NC
Dieldrin	6.58E-02	--	NC	--	NC	--	NC	1.58E-02	1.04E-03	--	NC	--	NC
Indeno(1,2,3-cd)pyrene	NC	--	NC	--	NC	3.60E-01	NC	--	NC	2.20E-01	NC	2.40E-01	NC
	Total HI:		NC		NC		NC		1.04E-03		NC		3.26E-02

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated.

SAUGET AREA 1 - EE/CA AND RI/FS
MLE

Receptors Evaluated:	
Receptor 1:	MLE Young Child
Receptor 3:	MLE Adult

ASSUMPTIONS FOR RESIDENTIAL RECEPTORS - MLE INHALATION OF OUTDOOR AIR PARTICULATES		Assumed Value	Units	Calculated Value
Inhalation Rate	MLE Young Child	0.32	(m^3 air/hour)	
Inhalation Rate	MLE Adult	0.55	(m^3 air/hour)	
Body Weight	MLE Young Child	15	(kg)	
Body Weight	MLE Adult	70	(kg)	
Exposure Time	MLE Young Child	6	(hrs/day) =	6.00E+00
Exposure Time	MLE Adult	2	(hrs/day) =	2.00E+00
Exposure Frequency	MLE Young Child	178	(days)/365 (days) =	4.88E-01
Exposure Frequency	MLE Adult	178	(days)/365 (days) =	4.88E-01
Exposure Duration (cancer)	MLE Young Child	2	(yrs)/70(yrs) =	2.86E-02
Exposure Duration (cancer)	MLE Adult	7	(yrs)/70(yrs) =	1.00E-01
Exposure Duration (noncancer)	MLE Young Child	2	(yrs)/2(yrs) =	1.00E+00
Lifetime		70	(years)	

P-151

SAUGET AREA 1 - EE/CA AND RI/FS
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR PARTICULATES
RESIDENTIAL RECEPTORS - MLE

Constituent	Unit Concentration In Air (mg/m³ air)	Inhalation Absorption Adjustment Factor	Inhalation Cancer Slope Factor (mg/kg-day)⁻¹	ADDinh MLE Young Child (mg/kg-day)	ADDinh MLE Adult (mg/kg-day)	Lifetime Average Daily Dose - Inh. (mg/kg-day)	Excess Lifetime Cancer Risk - Inhalation
Arsenic	1.00E+00	1	1.50E+01	1.79E-03	7.66E-04	2.55E-03	3.83E-02
Benzo(a)anthracene	1.00E+00	1	3.10E-01	1.79E-03	7.66E-04	2.55E-03	7.92E-04
Benzo(a)pyrene	1.00E+00	1	3.10E+00	1.79E-03	7.66E-04	2.55E-03	7.92E-03
Benzo(b)fluoranthene	1.00E+00	1	3.10E-01	1.79E-03	7.66E-04	2.55E-03	7.92E-04
Dibenzo(a,h)anthracene	1.00E+00	1	3.10E+00	1.79E-03	7.66E-04	2.55E-03	7.92E-03
Dieldrin	1.00E+00	1	1.61E+01	1.79E-03	7.66E-04	2.55E-03	4.11E-02
Indeno(1,2,3-cd)pyrene	1.00E+00	1	3.10E-01	1.79E-03	7.66E-04	2.55E-03	7.92E-04

P-152

TABLE
POTENTIAL CARCINOGENIC RISK
CARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR PARTICULATES
RESIDENTIAL RECEPTORS - MLE

Constituent	Reference Risk (per mg/m3)	Fill Area N		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7	
		EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk	EPC (mg/m3)	Risk
Arsenic	3.83E-02	--	NC	--	NC	--	NC	--	NC	--	NC	8.44E-09	3.23E-10
Benzo(a)anthracene	7.92E-04	--	NC	--	NC	5.91E-10	4.68E-13	--	NC	5.12E-10	4.05E-13	2.89E-10	2.29E-13
Benzo(a)pyrene	7.92E-03	2.37E-10	1.88E-12	1.16E-10	9.17E-13	4.99E-10	3.95E-12	1.17E-10	9.23E-13	4.26E-10	3.37E-12	3.16E-10	2.50E-12
Benzo(b)fluoranthene	7.92E-04	--	NC	1.35E-10	1.07E-13	5.07E-10	4.01E-13	--	NC	5.36E-10	4.24E-13	3.43E-10	2.72E-13
Dibenzo(a,h)anthracene	7.92E-03	9.18E-11	7.27E-13	5.91E-11	4.68E-13	1.10E-10	8.70E-13	8.33E-11	6.60E-13	9.97E-11	7.90E-13	8.70E-11	6.89E-13
Dieldrin	4.11E-02	--	NC	--	NC	--	NC	1.34E-11	5.49E-13	--	NC	--	NC
Indeno(1,2,3-cd)pyrene	7.92E-04	--	NC	--	NC	3.04E-10	2.41E-13	--	NC	1.86E-10	1.47E-13	2.03E-10	1.61E-13
	Total:		2.60E-12		1.49E-12		5.93E-12		2.13E-12		5.14E-12		3.27E-10

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration.
NC - Not Calculated.

P-153

SAUGET AREA 1 - EE/CA AND RI/FS
NONCARCINOGENIC ASSESSMENT
INHALATION OF
OUTDOOR AIR PARTICULATES
RESIDENTIAL RECEPTORS - MLE

Constituent	Unit Concentration In Air (mg/m^3 air)	Inhalation Absorption Adjustment Factor	Inhalation Reference Dose (mg/kg-day)	ADDinh MLE Young Child (mg/kg-day)	Chronic Average Daily Dose-Inh (mg/kg-day)	Hazard Index - Inhalation
Arsenic	1.00E+00	NA	NA	NA	NA	NC
Benzo(a)anthracene	1.00E+00	NA	NA	NA	NA	NC
Benzo(a)pyrene	1.00E+00	NA	NA	NA	NA	NC
Benzo(b)fluoranthene	1.00E+00	NA	NA	NA	NA	NC
Dibenzo(a,h)anthracene	1.00E+00	NA	NA	NA	NA	NC
Dieldrin	1.00E+00	NA	NA	NA	NA	NC
Indeno(1,2,3-cd)pyrene	1.00E+00	NA	NA	NA	NA	NC

P-154

SAUGET AREA 1 - EE/CA AND RI/FS
MLE

Receptor Evaluated:	
1:	MLE Young Child
2:	MLE Adult

Assumptions for Carcinogenic Assessment Risk by Ingestion of Locally Grown Produce	**Assumed Value**	**Units**	**Calculated Value**
Crop Consumption Rate (Young Child)	4	g/day	
Body Weight (Young Child)	15	(kg)	
Exposure Frequency (Young Child)	365	(days)/ 365 (days) =	1.00E+00
Exposure Duration (Young Child) (cancer)	2	(yrs)/ 70(yrs) =	2.86E-02
Exposure Duration (Young Child) (noncancer)	2	(yrs)/ 2(yrs) =	1.00E+00
Crop Consumption Rate (Adult)	125	g/day	
Body Weight (Adult)	70	(kg)	
Exposure Frequency (Adult)	365	(days)/ 365 (days) =	1.00E+00
Exposure Duration (Adult) (cancer)	7	(yrs)/ 70(yrs) =	1.00E-01
Lifetime	70	(years)	
Unit Conversion Factor	0.001	(kg/g)	

P-155

SAUGET AREA 1 - EE/CA AND RI/FS
MLE
Carcinogenic Assessment
Risk by Ingestion of Locally Grown Produce
Residential Adult and Child

Constituent	Unit Produce Concentration (mg/kg produce)	Oral Absorption Adjustment Factor	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	ADD Young Child (mg/kg-day)	ADD MLE Adult (mg/kg-day)	Lifeteme Average Daily Dose - Ing. of all Crop Types (mg/kg-day)	Excess Lifetime Cancer Risk
Arsenic	1.00E+00	1	1.50E+00	7.62E-06	1.79E-04	1.86E-04	2.79E-04

P-156

TABLE
POTENTIAL CARCINOGENIC RISK - MLE
INGESTION OF PRODUCE
RESIDENTIAL ADULT AND CHILD
SAUGET AREA 1 - EE/CA AND RI/FS

Constituent	Reference Risk All Produce (per mg/kg)	Transect 7				
		Above Ground (a)		Below Ground (b)		Total
		EPC (mg/kg)	Risk	EPC (mg/kg)	Risk	
Arsenic	2.79E-04	9.49E-03	1.83E-06	1.20E-02	1.04E-06	2.87E-06
	Total:		**1.83E-06**		**1.04E-06**	**2.87E-06**

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration (mg/kg produce).
NC - Not Calculated.
(a) - 69% of total vegetable ingestion is of above ground vegetables. Therefore, risk is the total produce concentration (mg/kg) x reference risk x 69%.
(b) - 31% of total vegetable ingestion is of below ground vegetables. Therefore, risk is the total produce concentration (mg/kg) x reference risk x 31%.

P-157

SAUGET AREA 1 - EE/CA AND RI/FS
MLE
Noncarcinogenic Assessment
Risk by Ingestion of Locally Grown Produce
Residential Child

Constituent	Unit Produce Concentration (mg/kg produce)	Oral Absorption Adjustment Factor	Oral Reference Dose (mg/kg-day)	Chronic Average Daily Dose - Ing. of all Crop Types (mg/kg-day)	Hazard Index
Arsenic	1.00E+00	1	3.00E-04	2.67E-04	8.89E-01

P–158

TABLE
POTENTIAL HAZARD INDEX - MLE
INGESTION OF PRODUCE
RESIDENTIAL CHILD
SAUGET AREA 1 - EE/CA AND RI/FS

Constituent	Reference HQ (All produce) (per mg/kg)	Transect 7				
		Above Ground (a)		Below Ground (b)		Total
		EPC (mg/kg)	HQ	EPC (mg/kg)	HQ	
Arsenic	8.89E-01	9.49E-03	5.82E-03	1.20E-02	3.30E-03	9.12E-03
	Total HI:		5.82E-03		3.30E-03	9.12E-03

Notes:
-- Not a constituent of potential concern in this area/medium.
EPC - Exposure Point Concentration (mg/kg produce).
HI - Hazard Index.
HQ - Hazard Quotient.
NC - Not Calculated.
(a) - 69% of total vegetable ingestion is of above ground vegetables. Therefore, risk is the total produce concentration (mg/kg) x reference risk x 69%.
(b) - 31% of total vegetable ingestion is of below ground vegetables. Therefore, risk is the total produce concentration (mg/kg) x reference risk x 31%.

APPENDIX Q

ASSESSMENT OF POTENTIAL LEAD EXPOSURES

APPENDIX Q
ASSESSMENT OF POTENTIAL LEAD EXPOSURES

Lead was identified as constituent of potential concern (COPC) in a single non-potable use well (DW-MCDO) within the study area. Therefore, incidental ingestion of groundwater associated with residential use (such as car washing) or potential construction and/or utility repair was evaluated in the risk assessment.

For many compounds associated with known or potential noncarcinogenic health effects, it has been demonstrated that there is a threshold for these effects. It is conventionally assumed for all such compounds that there is a dose below which no adverse effect occurs or, conversely, above which an adverse effect may be seen. For compounds with known or suspected carcinogenic effects, the underlying assumption for all regulatory risk assessment is that there is no threshold for effects. Thus, every dose, no matter how small, is assumed to pose some finite level of risk.

Because of the uncertainties in the dose-response relationship between exposure to lead and biological effects, it is unclear whether the noncarcinogenic effects of lead exhibit a threshold response. Therefore, an RfD for lead is not available. Although USEPA has classified lead as a B2 (probable human) carcinogen, no cancer slope factor (CSF) has been developed. Therefore, potential exposures to lead cannot be evaluated using the traditional methods of risk assessment. However, the USEPA has developed an Integrated Exposure Uptake Biokinetic (IEUBK) model that correlates lead levels in the environment to blood lead levels in children (USEPA, 1994), and a model for assessing adult exposures to lead in multiple environmental media (air, soil, and water) in an industrial/commercial setting is available in the peer reviewed literature (Bowers et al., 1994).

USEPA IEUBK Model

It is generally believed that increasing blood lead concentrations in children correlate with adverse neurological effects. The IEUBK model is a computer program that links typical risk assessment exposure analysis with a biokinetic model of lead uptake and distribution in the body to enable estimates of blood lead levels that may occur due to overall exposures to lead in the environment. The IEUBK model predicts blood lead levels in children 0-7 years of age due to exposure to lead from multiple sources, including air, water, diet, soil, and maternal sources, and considers differing exposure patterns and physiological changes in the various age groups. Children 0-7 years of age are considered by US EPA to be sensitive receptors for lead exposure because, compared to older receptors, young children ingest more soil, absorb more lead from the gastrointestinal tract, and are more sensitive to the effects of lead in the bloodstream. The health effects of most concern from lead exposures are impaired mental and physical development in young children. Available evidence suggests that a threshold dose for these effects lies between 10 to 15 micrograms of lead per deciliter of blood (µg/dL) (USEPA, 1994).

Potential risk associated with incidental exposure of a young child (0-6 years of age) to lead as a result of non-potable groundwater use was evaluated using USEPA's IEUBK model (version 0.99d) (USEPA, 1994b).

Key assumptions in the IEUBK model are briefly discussed below:

Lead In Air: The model assumes a background concentration of lead in outdoor air of 0.1 ug/m^3 lead (based on the average lead concentration in outdoor air in urban areas in 1990) and in indoor air was assumed to be 30 percent of that for outdoor air or 0.03 ug/m^3. Age-specific air inhalation rates ranging from 2 to 7 m^3/day are used to estimate intake of lead via inhalation, and fractional uptake of inhaled lead was assumed to be 0.32.

Lead in the Diet: The model assumes an average ingestion of lead in diet that on an age-specific basis ranges from 0.006 to 0.007 mg lead/day. These values are based on FDA reported dietary lead intake for U.S. children (6 months to 6 years of age) from 1987 to 1994. Fractional uptake of lead ingested in the diet was assumed to be 0.50.

Lead in Drinking Water: The model assumes a background concentration of lead in drinking water of 4 ug/L. Age-specific drinking water ingestion rates ranging from 0.20 to 0.59 L/day for U.S. children ages 6 months to 6 years were used to estimate lead intake and fractional uptake of lead ingested in water was assumed to be 0.50. In order to evaluate site-specific exposure to lead in non-potable groundwater, a site-specific water concentration of 129 ug/L and a water ingestion rate of 0.005 L/day were substituted for all age groups evaluated (0-6 years of age).

Lead in Outdoor Soil and Indoor Dust: Age-specific average outdoor soil plus indoor dust ingestion rates ranging from 85 to 135 mg/day are used by the model and it is assumed that 45 percent of total ingestion is from soil and 55 percent is from dust. USEPA recommends that central tendency (average) rates of soil plus dust ingestion be used in IEUBK model, rather than the upper-bound soil plus dust ingestion rate of 200 mg/day. The source of lead in indoor dust is assumed to be lead in outdoor soil, and the concentration of lead in indoor dust is assumed to be 0.7 of that in outdoor soil, based on measured soil-dust relationships at other sites where soil was a major contributor to indoor dust. The fractional uptake of lead from soil and dust was assumed to be 0.30. Lead was not identified as a COPC in soil; however, in order to evaluate potential impacts of cumulative exposure to lead in environmental media at the site, a concentration of 72 mg/kg has been assumed for lead in both soil and indoor dust for the young child resident. This represents the average soil concentration for Transect 1 and is the highest average lead concentration identified in soil from the three transects (Transects 1, 2, and 3) nearest the one non-potable groundwater well (DW-MCDO) where lead was identified as a COPC.

The IEUBK model calculates a distribution of blood lead concentration in children, both graphically and in table format. The results are presented in Figure Q-1 and Table Q-1. As can be seen in Figure Q-1, 99.95% of young children potentially exposed to lead under the condition summarized above are predicted to exhibit blood lead concentrations lower than the acceptable blood lead level of 10 µg/dL. The USEPA regulatory target is at least 95% of young children in a population potentially exposed to lead having blood lead levels below 10 µg/dL. Therefore, under the conditions described above no adverse health effects are expected for young children potentially exposed to lead groundwater.

Adult Lead Exposure Model of Bowers et al., 1994

Lead was identified as a COPC in only one non-potable use groundwater well at the site. The evaluation of potential adverse health effects resulting from exposure to lead must consider other factors and assumptions in addition to the carcinogenic or noncarcinogenic risks of lead. Due to the uncertainties in the dose-response relationship between exposure to lead and biological effects, it is unclear whether the noncarcinogenic effects of lead exhibit a threshold response. Therefore, an RfD for lead is not available and potential exposure to lead cannot be evaluated using the traditional methods of risk assessment. The USEPA (1996) has developed a model for evaluating adult worker exposure to lead in soil at site being evaluated for industrial/commercial use. Given the need to evaluate incidental construction worker exposure to lead in groundwater, the USEPA model is not strictly applicable at this site. However, a model for evaluating adult exposure to elevated levels of lead in multiple environmental media (air, soil, and water) is available from peer reviewed literature (Bowers et al., 1994). The model of Bowers et al., (1994) is based upon a biokinetic slope factor (BSF) approach conceptually similar to that upon which the USEPA (1996) model is based.

Lead was identified as a COPC in only one non-potable use groundwater well at the site; however, as a conservative measure potential construction worker exposure to lead in excavation air, soil, and groundwater was evaluated in this risk assessment. Potential exposure to lead in soil and groundwater via dermal contact was not evaluated in this risk assessment. Direct contact with groundwater may occur during soil excavation. However, this potential exposure pathway is not expected to contribute significantly to the future construction worker, because of the limited body surface area in contact with groundwater (i.e., hands and forearms), and the short duration of contact. In addition, the potential absorbed dermal dose from lead in groundwater is expected to be negligible due to the low skin permeability constant of lead compounds in water ($K_p = 4x10^{-6}$ cm/hr). USEPA (1992) states that compounds with K_ps less than 0.1 cm/hr are probably not important to consider for the dermal exposure pathway.

The adult lead exposure model of Bowers et al. (1994) assumes that there is a baseline blood lead level in the adult population of the United States.. It is assumed that the baseline blood lead level reflects typical exposure arises primarily due to lead in the diet. The model also incorporates ingestion and absorption rates specific to each potential exposure pathway. It is assumed that there is a relationship between uptake of lead into the body and blood lead levels. A numerical value, called a biokinetic slope factor, was assigned by Bowers et al. to represent the relationship between uptake of lead into the body and blood levels.

The following equation was used to predict the average expected blood lead level for a hypothetical construction worker:

PbB (µg/dL) = $PbB_{baseline}$ (µg/dL)

+ BSF (µg/dL per µg/day)

x [($Uptake_{air}$ (µg/day)

+ $Uptake_{soil}$ (µg/day)

+ $Uptake_{water}$ (µg/day)]

$PbB_{baseline}$

The baseline blood lead concentration ($PbB_{baseline}$) represents the best estimate of a reasonable central tendency value for women of child-bearing age without previous excessive occupational exposures. The USEPA Technical Review Workgroup (TRW) for Lead (USEPA, 1996) has developed three potential baseline blood lead levels which are dependent on race. For the purposes of this risk assessment the highest baseline blood level of 2.2 µg/dL for non-Hispanic black women was selected. Given that the ethnic and racial demographics of the population in the vicinity of the site are unknown, this is a conservative assumption.

BSF

The biokinetic slope factor (BSF) relates blood lead levels to lead uptake. The TRW recommended BSF of 0.4 µg Pb/dL blood per µg Pb absorbed/day (USEPA, 1996) was utilized in this screening level risk assessment.

$Uptake_{air}$

The fraction of lead taken into the body from air ($Uptake_{air}$) is calculated using the following equation:

$Uptake_{air}$ (µg/day) = Air lead absorption factor (unitless)

x Inhalation rate (m^3/day)

x Concentration of lead in air (µg/m^3)

x [Exposure Frequency (days)

/ Averaging Time (days)]

Air Lead Absorption Factor

The air lead absorption factor for lead 0.32 recommended by Bowers et al., (1994), was utilized in this risk assessment.

Inhalation Rate (m^3/day)

An inhalation rate of 20 m^3/day was used in this risk assessment. This is equivalent to the inhalation rate value for heavy activity for an outdoor worker listed in Table 5-23 of the Exposure Factors Handbook (USEPA, 1997).

Concentration of Lead in Air ($\mu g/m^3$)

Lead was not identified as a COPC in air; however, in order to evaluate potential impacts of cumulative exposure to lead in environmental media at the site, an exposure point concentration for lead in excavation air was derived. The excavation air concentration was estimated by multiplying the soil concentration of 72 mg/kg by a PM10 dust concentration of 0.06 mg/m^3 measured in the vicinity of construction sites (MADEP 1995) an then multiplying by a unit correction factor of 1×10^{-6} kg/mg. The predicted lead excavation dust concentration utilized in this risk assessment is 4.32×10^{-6} mg/m^3.

Exposure Frequency

In this risk assessment an exposure frequency of 40 days per year is assumed for the evaluation of potential construction worker exposure to lead in environmental media.

Averaging Time

In this risk assessment an averaging time of 365 days (i.e., one year) is assumed for the evaluation of potential construction worker exposure to lead in environmental media.

<u>$Uptake_{soil}$</u>

The fraction of lead taken into the body from soil ($Uptake_{soil}$) is calculated using the following equation:

$Uptake_{soil}$ (μg/day) = Soil lead absorption factor (unitless)

x Soil ingestion rate (g/day)

x Concentration of lead in soil (μg/g)

x [Exposure Frequency (days)

/ Averaging Time (days)]

Soil Lead Absorption Factor

The TRW recommended default value of 0.12 (USEPA, 1996) was utilized for the soil lead absorption factor in this risk assessment.

Soil Ingestion Rate

A soil ingestion rate of 100 mg/day (0.1 g/day; USEPA, 1989) was assumed for the construction worker. This is consistent with recent TRW lead guidance on selecting construction worker soil ingestion rates for use in evaluating potential exposure to lead in soil (USEPA, 1999).

Concentration of Lead in Soil

Lead was not identified as a COPC in soil; however, in order to evaluate potential impacts of cumulative exposure to lead in environmental media at the site, a concentration of 72 mg/kg has been assumed for lead in soil. This represents the average soil concentration for Transect 1 and is the highest average lead concentration identified in soil from the three transects (Transects 1, 2, and 3) nearest the one non-potable groundwater well (DW-MCDO) where lead was identified as a COPC.

Exposure Frequency

In this risk assessment an exposure frequency of 40 days per year is assumed for the evaluation of potential construction worker exposure to lead in environmental media.

Averaging Time

Averaging time is specific to each potential exposure scenario. In this risk assessment an averaging time of 365 days (i.e., one year) is assumed for the evaluation of potential construction worker exposure to lead in environmental media.

$\underline{\text{Uptake}_{water}}$

The fraction of lead taken into the body from water (Uptake_{water}) is calculated using the following equation:

Uptake_{water} (µg/day) = Water lead absorption factor (unitless)

x Water ingestion rate (L/day)

x Concentration of lead in water (µg/L)

x [Exposure Frequency (days)

/ Averaging Time (days)]

Water Lead Absorption Factor

The TRW assumption that the absorption factor for soluble lead is 0.2 (USEPA, 1996), was utilized in this risk assessment.

Water Ingestion Rate (L/day)

In this risk assessment it is assumed that a construction worker may inadvertently ingest 0.005 liters of groundwater per day. This is equivalent to one-tenth that assumed to occur during a swimming event (USEPA, 1989).

Concentration of Lead in Water

Lead was detected in only one non-potable use groundwater well (DW-MCDO) at the site. A site-specific water concentration of 129 ug/L was utilized in this risk assessment for evaluation of the construction worker exposure scenario.

Predicted Blood Lead Levels

As can be seen in Table Q-2, an average expected blood lead level of 2.24 μg/dL is predicted for a hypothetical construction worker potentially exposed to lead in excavation, air, soil and groundwater. This is below acceptable Occupational Safety and Health Administration (OSHA) standards for adult workers (29 CFR, Part 1910.1025). The OSHA standards for blood lead levels are as follows: 1) Blood lead levels of workers (male and female) intending to have children should remain below 30 μg/dL.; and 2) OSHA allows 40 μg/dL as a "permissible" blood lead level in lead-exposed workers, below which no further medical monitoring or workplace intervention is required. It is also below the USEPA target blood lead level of 10 μg/dL for protection of a developing fetus (USEPA, 1996).

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APPENDIX R

TOXIC ENDPOINT ANALYSIS

APPENDIX R
TOXIC ENDPOINT ANALYSIS

This appendix presents the toxic endpoint analysis for the evaluation of noncarcinogenic total hazard indices for receptors whose total site hazard index exceeded the target value of 1.

In the report, a hazard quotient is calculated for each COPC for each receptor at each exposure point. When the HQ is less than one, the RfD has not been exceeded, and no adverse noncarcinogenic health effects are expected. Notice that this is not a calculation of risk, per se. That is, the hazard quotient does not predict the probability of health effect. It simply indicates whether an exposure estimate is above or below a dose assumed to be unlikely to produce an effect. However, because the RfD has the connotation of being "acceptable" (i.e., unlikely to result in effects) risk management decisions may be made based on whether the HQ is above or below one. A total receptor-specific HI is calculated for each exposure pathway by summing the HQ for each individual constituent for that receptor. This approach accounts for the possibility that the toxicity of all COPCs are additive and should be regarded only as a screening assessment because additive toxicity may not be correct. Again, if the total HI is below one, a remedial response would not normally be required. If the HI is greater than one, further evaluation to identify COPCs that may be additive (or otherwise interactive) in their toxicity should be conducted before making decisions. Such an evaluation is termed a toxic endpoint analysis. Toxicologically, only the HQs of chemicals having similar toxic endpoints can be added together to provide an HI for a given effect.

The toxic endpoints based on oral and inhalation exposures to COPCs are presented in Table R-1. The toxic endpoint information in this table was identified either by IRIS, HEAST or NCEA using the information on the dose-response tables presented in Section 4.0 of the text.. A single COPC can have more than one toxic endpoint. For example, the HQ for ethylbenzene is appropriately additive with other COPC that have "liver effects" identified as a toxic endpoint. However, because the toxic endpoint for ethylbenzene is identified as liver and kidney toxicity, the HQ for ethylbenzene is also added with the HQ for other COPC exhibiting kidney effects.

Five receptor scenarios were identified as having total HI greater than 1. These are:

- RME Outdoor Worker in Fill Area I
- RME Construction Worker in Fill Area G
- RME Construction Worker in Fill Area H
- MLE Construction Worker in Fill Area H
- RME Construction Worker in Fill Area I

The target HI exceedance for both receptors in Fill Area I is due to potential exposures to PCBs, therefore, a toxic endpoint analysis was not needed (moreover, none of the other COPCs share the same toxic endpoints with PCBs).
Therefore, a toxic endpoint analysis was conducted for the construction worker receptor for Fill Areas G and H. The analyses presented in the following tables:

- Table R-2: RME Construction Worker in Fill Area G
- Table R-3: RME Construction Worker in Fill Area H
- Table R-4: MLE Construction Worker in Fill Area H

The results are discussed in the text in Section 6.0.

TABLE R-1
TOXIC ENDPOINTS FOR POTENTIAL NONCARCINOGENIC EFFECTS
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Dec. Body Weight		Develop. Effects		Blood Effects		Liver Effects		Kidney Effects		Neuro. Effects		GI Effects		Reproductive Effects		Vascular Effects		Dec. Longevity		Nasal Effects		Immune Effects		Spleen Effects		Skin Effects		Eye Effects		None Reported		No D/R Available	
Constituent	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh
1,1,2,2-Tetrachloroethane																															N			X
1,4 Dichlorobenzene								X																							N			
2,4,5-TP (Silvex)							X																											X
2,4,6-Trichlorophenol																																	X	X
2,4-Dichlorophenol																							X											X
2-Chlorophenol															X																			X
2-Nitroaniline						X																											X	
3-Methylphenol/4-Methylphenol	X										X																							X
4,4-DDE																																	X	X
4-Chloroaniline																									X									X
4-Methyl-2-pentanone							X	X	X	X																								
4-Nitroaniline						X																											X	
Acetone							X		X																									X
alpha-BHC																																	X	X
Antimony					X														X															X
Arsenic																	X										X							X
Benzene					X	X																												
Benzo(a)anthracene																																	X	X
Benzo(a)pyrene																																	X	X
Benzo(b)fluoranthene																																	X	X
Benzo(k)fluoranthene																																	X	X
beta-BHC																																	X	X
Cadmium									X																									X
Carbazole																																	X	X
Chlorobenzene							X	X		X																								
Chloroform							X															X												
Cis/Trans-1,2-Dichloroethene					X																													X

R-4

TABLE R-1
TOXIC ENDPOINTS FOR POTENTIAL NONCARCINOGENIC EFFECTS
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent	Dec. Body Weight		Develop. Effects		Blood Effects		Liver Effects		Kidney Effects		Neuro. Effects		GI Effects		Reproductive Effects		Vascular Effects		Dec. Longevity		Nasal Effects		Immune Effects		Spleen Effects		Skin Effects		Eye Effects		None Reported		No D/R Available	
	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh	Ing	Inh
Copper													X																					X
delta-BHC							X		X																									X
Dibenzo(a,h)anthracene																																	X	X
Dieldrin							X																											X
Ethylbenzene				X			X		X																									
gamma-BHC							X		X																									X
Heptachlor							X																											X
Heptachlor epoxide							X																											X
Indeno(1,2,3-cd)pyrene																																	X	X
Lead																																	X	X
Molybdenum									X																									X
Naphthalene	X																					X												
Nickel	X																																	X
Nitrobenzene					X	X	X	X	X	X																								
Pentachlorophenol							X		X																									X
Phenol			X																															X
Tetrachloroethene	X						X	X		X																								
Toluene							X		X			X																						
Total 2,3,7,8-TCDD TEQ																																	X	X
Total PCBs																							X				X		X					X
Trichloroethene							X																											X
Vanadium																															X			X
Vinyl chloride							X	X																										
Zinc					X																													X

Notes:
Dec - Decreased
Develop. - Developmental
D/R - Dose-Response
GI - Gastrointestinal
Ing - Ingestion
Inh - Inhalation
Neuro - Neurological
N - Value provided by NCEA as reported in USEPA Region 9 PRG Table (USEPA, 1999), toxic endpoint information not available.
X - This endpoint was identified for this exposure route for this constituent

TABLE R-2
HAZARD INDEX BY TARGET ENDPOINT
RME CONSTRUCTION WORKER
FILL AREA G
EXPOSURE TO COPCs IN EXCAVATION GROUNDWATER
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Decreased Body Weight			Developmental Effects			Blood Effects			Liver Effects		
Constituent (a)	Ing HQ	Inh HQ	Total HQ	Ing HQ	Inh HQ	Total HQ	Ing HQ	Inh HQ	Total HQ	Ing HQ	Inh HQ	Total HQ
1,4-Dichlorobenzene												
2,4,5-TP (Silvex)										0.0001		0.0001
2,4-Dichlorophenol												
2-Chlorophenol												
3-Methylphenol/4-Methylphenol	0.0002		0.0002									
4-Chloroaniline												
4-Methyl-2-pentanone										0.00003	0.09	0.09
Benzene							0.03	0.95	0.98			
Chlorobenzene										0.005	0.34	0.34
delta-BHC										0.0004		0.0004
Molybdenum												
Naphthalene	0.004		0.004									
Pentachlorophenol										0.02		0.02
Phenol				0.0001		0.0001						
Tetrachloroethene	0.0004		0.0004							0.0004	0.0006	0.0009
Toluene										0.0009		0.0009
Trichloroethene										0.0003		0.0003
Vanadium												
Vinyl chloride										0.0001	0.0007	0.0008
Total HI:	**0.004**		**0.004**	**0.0001**		**0.0001**	**0.03**	**0.95**	**0.98**	**0.03**	**0.42**	**0.45**

Notes:
COPC - Constituent of Potential Concern.
Ing - Ingestion.
HI - Hazard Index.
HQ - Hazard Quotient.
RME - Reasonable Maximum Exposure.
(a) - Only constituents for which HQs were calculated are included here. See Table 6-6.

TABLE R-2
HAZARD INDEX BY TARGET ENDPOINT
RME CONSTRUCTION WORKER
FILL AREA G
EXPOSURE TO COPCs IN EXCAVATION GROUNDWATER
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Kidney Effects			Neurological Effects			Reproductive Effects			Nasal Effects		
Constituent (a)	Ing HQ	Inh HQ	Total HQ	Ing HQ	Inh HQ	Total HQ	Ing HQ	Inh HQ	Total HQ	Ing HQ	Inh HQ	Total HQ
1,4-Dichlorobenzene												
2,4,5-TP (Silvex)												
2,4-Dichlorophenol												
2-Chlorophenol							0.0007		0.0007			
3-Methylphenol/4-Methylphenol				0.0002		0.0002						
4-Chloroaniline												
4-Methyl-2-pentanone	0.00003	0.09	0.09									
Benzene												
Chlorobenzene		0.34	0.34									
delta-BHC	0.0004		0.0004									
Molybdenum	0.0001		0.0001									
Naphthalene											0.99	0.99
Pentachlorophenol	0.02		0.02									
Phenol												
Tetrachloroethene		0.0006	0.0006									
Toluene	0.0009		0.0009		0.031	0.031						
Trichloroethene												
Vanadium												
Vinyl chloride												
Total HI:	0.02	0.42	0.44	0.0002	0.03	0.03	0.0007		0.0007		0.99	0.99

Notes:
COPC - Constituent of Potential Concern.
Ing - Ingestion.
HI - Hazard Index.
HQ - Hazard Quotient.
RME - Reasonable Maximum Exposure.
(a) - Only constituents for which HQs were calculated are included here. See Table 6-6.

TABLE R-2
HAZARD INDEX BY TARGET ENDPOINT
RME CONSTRUCTION WORKER
FILL AREA G
EXPOSURE TO COPCs IN EXCAVATION GROUNDWATER
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

Constituent (a)	Immune Effects			Spleen Effects			None Reported			No Dose Response Value Available	
	Ing HQ	Inh HQ	Total HQ	Ing HQ	Inh HQ	Total HQ	Ing HQ	Inh HQ	Total HQ	Ing	Inh
1,4-Dichlorobenzene							0.0008		0.0008		
2,4,5-TP (Silvex)											X
2,4-Dichlorophenol	0.0128		0.0128								X
2-Chlorophenol											X
3-Methylphenol/4-Methylphenol											X
4-Chloroaniline				0.02		0.02					X
4-Methyl-2-pentanone											
Benzene											
Chlorobenzene											
delta-BHC											X
Molybdenum											X
Naphthalene											
Pentachlorophenol											X
Phenol											X
Tetrachloroethene											
Toluene											
Trichloroethene											X
Vanadium							*0.0001*		*0.0001*		*X*
Vinyl chloride											
Total HI:	0.01		0.01	0.02		0.02	0.0008		0.001		

Notes:
COPC - Constituent of Potential Concern.
Ing - Ingestion.
HI - Hazard Index.
HQ - Hazard Quotient.
RME - Reasonable Maximum Exposure
(a) - Only constituents for which HQs were calculated are included here. See Table 6-6.

TABLE R-3
HAZARD INDEX BY TARGET ENDPOINT
RME CONSTRUCTION WORKER
FILL AREA H - EXPOSURE TO COPCs IN
EXCAVATION GROUNDWATER AND SURFACE SOIL
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Decreased Body Weight			Developmental Effects			Blood Effects			Liver Effects		
Constituent (a)	**Ing HQ**	**Inh HQ**	**Total HQ**	**Ing HQ**	**Inh HQ**	**Total HQ**	**Ing HQ**	**Inh HQ**	**Total HQ**	**Ing HQ**	**Inh HQ**	**Total HQ**
1,1,2,2-Tetrachloroethane												
1,4-Dichlorobenzene												
2,4-Dichlorophenol												
4-Chloroaniline												
Antimony							0.0003		0.0003			
Arsenic												
Benzene							0.03	0.94	0.960			
Chlorobenzene										0.005	0.38	0.39
Chloroform										0.0002		0.0002
Ethylbenzene					0.002	0.002				0.0006		0.0006
Heptachlor epoxide										0.002		0.002
Naphthalene	0.004		0.004									
Nitrobenzene							0.0004		0.0004	0.0004		0.0004
Pentachlorophenol										0.05		0.05
Phenol				0.000002		0.000002						
Total PCBs												
Trichloroethene										0.0001		0.0001
Total HI:	**0.004**		**0.004**	**0.000002**	**0.002**	**0.002**	**0.03**	**0.94**	**0.96**	**0.06**	**0.38**	**0.44**

Notes:
All HQs are for groundwater, unless otherwise noted.
gw - Groundwater.
(a) - Only constituents for which HQs were calculated are included here. See Table 6-6.
COPC - Constituent of Potential Concern.
HI - Hazard Index.
HQ - Hazard Quotient.
Ing - Ingestion.
RME - Reasonable Maximum Exposure.

TABLE R-3
HAZARD INDEX BY TARGET ENDPOINT
RME CONSTRUCTION WORKER
FILL AREA H - EXPOSURE TO COPCs IN
EXCAVATION GROUNDWATER AND SURFACE SOIL
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Kidney Effects			Vascular Effects			Decreased Longevity			Nasal Effects		
Constituent (a)	**Ing HQ**	**Inh HQ**	**Total HQ**	**Ing HQ**	**Inh HQ**	**Total HQ**	**Ing HQ**	**Inh HQ**	**Total HQ**	**Ing HQ**	**Inh HQ**	**Total HQ**
1,1,2,2-Tetrachloroethane												
1,4-Dichlorobenzene												
2,4-Dichlorophenol												
4-Chloroaniline												
Antimony							0.0003		0.0003			
Arsenic				0.01 soil, 0.003 gw		0.01						
Benzene												
Chlorobenzene		0.38	0.38									
Chloroform											2.12	2.12
Ethylbenzene	0.0006		0.0006									
Heptachlor epoxide												
Naphthalene											0.99	0.99
Nitrobenzene	0.0004		0.0004									
Pentachlorophenol	0.05		0.05									
Phenol												
Total PCBs												
Trichloroethene												
Total HI:	**0.05**	**0.38**	**0.43**	**0.01**		**0.01**	**0.0003**		**0.0003**		**3.12**	**3.12**

Notes:
All HQs are for groundwater, unless otherwise noted.
gw - Groundwater.
(a) - Only constituents for which HQs were calculated are included here. See Table 6-6.
COPC - Constituent of Potential Concern.
HI - Hazard Index.
HQ - Hazard Quotient.
Ing - Ingestion.
RME - Reasonable Maximum Exposure.

TABLE R-3
HAZARD INDEX BY TARGET ENDPOINT
RME CONSTRUCTION WORKER
FILL AREA H - EXPOSURE TO COPCs IN
EXCAVATION GROUNDWATER AND SURFACE SOIL
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Immune Effects			Spleen Effects			Skin Effects			Eye Effecs		
Constituent (a)	**Ing HQ**	**Inh HQ**	**Total HQ**	**Ing HQ**	**Inh HQ**	**Total HQ**	**Ing HQ**	**Inh HQ**	**Total HQ**	**Ing HQ**	**Inh HQ**	**Total HQ**
1,1,2,2-Tetrachloroethane												
1,4-Dichlorobenzene												
2,4-Dichlorophenol	0.001		0.001									
4-Chloroaniline				0.002		0.002						
Antimony												
Arsenic							0.01 soil, 0.003 gw		0.01			
Benzene												
Chlorobenzene												
Chloroform												
Ethylbenzene												
Heptachlor epoxide												
Naphthalene												
Nitrobenzene												
Pentachlorophenol												
Phenol												
Total PCBs	0.01 -soil		0.01				0.01-soil		0.01	0.01 -soil		0.01
Trichloroethene												
Total HI:	**0.01**		**0.01**	**0.002**		**0.002**	**0.02**		**0.02**	**0.01**		**0.01**

Notes:
All HQs are for groundwater, unless otherwise noted.
gw - Groundwater.
(a) - Only constituents for which HQs were calculated are included here. See Table 6-6.
COPC - Constituent of Potential Concern.
HI - Hazard Index.
HQ - Hazard Quotient.
Ing - Ingestion.
RME - Reasonable Maximum Exposure.

TABLE R-3
HAZARD INDEX BY TARGET ENDPOINT
RME CONSTRUCTION WORKER
FILL AREA H - EXPOSURE TO COPCs IN
EXCAVATION GROUNDWATER AND SURFACE SOIL
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	None Reported			No Dose Response Value Available	
Constituent (a)	**Ing HQ**	**Inh HQ**	**Total HQ**	**Ing**	**Inh**
1,1,2,2-Tetrachloroethane	0.000001		0.000001		X
1,4-Dichlorobenzene	0.003		0.003		
2,4-Dichlorophenol					X
4-Chloroaniline					X
Antimony					X
Arsenic					X
Benzene					
Chlorobenzene					
Chloroform					
Ethylbenzene					
Heptachlor epoxide					X
Naphthalene					
Nitrobenzene					
Pentachlorophenol					X
Phenol					X
Total PCBs					X
Trichloroethene					X
Total HI:	**0.003**		**0.003**		

Notes:
All HQs are for groundwater, unless otherwise noted.
gw - Groundwater.
(a) - Only constituents for which HQs were calculated are included here. See Table 6-6.
COPC - Constituent of Potential Concern.
HI - Hazard Index.
HQ - Hazard Quotient.
Ing - Ingestion.
RME - Reasonable Maximum Exposure.

TABLE R-4
HAZARD INDEX BY TARGET ENDPOINT
MLE CONSTRUCTION WORKER
FILL AREA H - EXPOSURE TO COPCs IN
EXCAVATION GROUNDWATER AND SURFACE SOIL
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Decreased Body Weight			Developmental Effects			Blood Effects			Liver Effects		
Constituent (a)	**Ing HQ**	**Inh HQ**	**Total HQ**	**Ing HQ**	**Inh HQ**	**Total HQ**	**Ing HQ**	**Inh HQ**	**Total HQ**	**Ing HQ**	**Inh HQ**	**Total HQ**
1,1,2,2-Tetrachloroethane												
1,4-Dichlorobenzene												
2,4-Dichlorophenol												
4-Chloroaniline												
Antimony							0.0001		0.0001			
Arsenic												
Benzene							0.01	0.28	0.293			
Chlorobenzene										0.003	0.11	0.12
Chloroform										0.0001		0.0001
Ethylbenzene					0.001	0.001				0.0003		0.0003
Heptachlor epoxide										0.001		0.001
Naphthalene	0.002		0.002									
Nitrobenzene							0.0002		0.0002	0.0002		0.0002
Pentachlorophenol										0.02		0.02
Phenol				0.000001		0.000001						
Total PCBs												
Trichloroethene										0.00003		0.00003
Total HI:	**0.002**		**0.002**	**0.000001**	**0.001**	**0.001**	**0.01**	**0.28**	**0.29**	**0.02**	**0.11**	**0.14**

Notes:
All HQs are for groundwater, unless otherwise noted.
gw - Groundwater.
(a) - Only constituents for which HQs were calculated are included here. See Table 6-20.
COPC - Constituent of Potential Concern.
HI - Hazard Index.
HQ - Hazard Quotient.
Ing - Ingestion.
MLE - Most Likely Exposure.

TABLE R-4
HAZARD INDEX BY TARGET ENDPOINT
MLE CONSTRUCTION WORKER
FILL AREA H - EXPOSURE TO COPCs IN
EXCAVATION GROUNDWATER AND SURFACE SOIL
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Kidney Effects			Vascular Effects			Decreased Longevity			Nasal Effects		
Constituent (a)	**Ing HQ**	**Inh HQ**	**Total HQ**	**Ing HQ**	**Inh HQ**	**Total HQ**	**Ing HQ**	**Inh HQ**	**Total HQ**	**Ing HQ**	**Inh HQ**	**Total HQ**
1,1,2,2-Tetrachloroethane												
1,4-Dichlorobenzene												
2,4-Dichlorophenol												
4-Chloroaniline												
Antimony							0.0001		0.0001			
Arsenic				0.001 (soil) 0.002 (gw)		0.003						
Benzene												
Chlorobenzene		0.11	0.11									
Chloroform											0.64	0.64
Ethylbenzene	0.0003		0.0003									
Heptachlor epoxide												
Naphthalene											0.30	0.30
Nitrobenzene	0.0002		0.0002									
Pentachlorophenol	0.02		0 02									
Phenol												
Total PCBs												
Trichloroethene												
Total HI:	***0.02***	***0.11***	***0.13***	***0.003***		***0.003***	***0.0001***		***0.0001***		***0.93***	***0.93***

Notes:
All HQs are for groundwater, unless otherwise noted.
gw - Groundwater.
(a) - Only constituents for which HQs were calculated are included here. *See Table 6-20.*
COPC - Constituent of Potential Concern.
HI - Hazard Index.
HQ - Hazard Quotient.
Ing - Ingestion.
MLE - Most Likely Exposure.

TABLE R-4
HAZARD INDEX BY TARGET ENDPOINT
MLE CONSTRUCTION WORKER
FILL AREA H - EXPOSURE TO COPCs IN
EXCAVATION GROUNDWATER AND SURFACE SOIL
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	Immune Effects			Spleen Effects			Skin Effects			Eye Effecs		
Constituent (a)	**Ing HQ**	**Inh HQ**	**Total HQ**	**Ing HQ**	**Inh HQ**	**Total HQ**	**Ing HQ**	**Inh HQ**	**Total HQ**	**Ing HQ**	**Inh HQ**	**Total HQ**
1,1,2,2-Tetrachloroethane												
1,4-Dichlorobenzene												
2,4-Dichlorophenol	0.001		0.001									
4-Chloroaniline				0.001		0.001						
Antimony												
Arsenic							0.001 (soil) 0.002 (gw)		0.003			
Benzene												
Chlorobenzene												
Chloroform												
Ethylbenzene												
Heptachlor epoxide												
Naphthalene												
Nitrobenzene												
Pentachlorophenol												
Phenol												
Total PCBs	0.002 (soil)		0.002				0.002 (soil)		0.002	0.002 (soil)		0.002
Trichloroethene												
Total HI:	**0.003**		**0.003**	**0.001**		**0.001**	**0.005**		**0.005**	**0.002**		**0.002**

Notes:
All HQs are for groundwater, unless otherwise noted.
gw - Groundwater.
(a) - Only constituents for which HQs were calculated are included here. See Table 6-20.
COPC - Constituent of Potential Concern.
HI - Hazard Index.
HQ - Hazard Quotient.
Ing - Ingestion.
MLE - Most Likely Exposure.

TABLE R-4
HAZARD INDEX BY TARGET ENDPOINT
MLE CONSTRUCTION WORKER
FILL AREA H - EXPOSURE TO COPCs IN
EXCAVATION GROUNDWATER AND SURFACE SOIL
SAUGET AREA 1 - EE/CA AND RI/FS
HUMAN HEALTH RISK ASSESSMENT

	None Reported			No Dose Response Value Available	
Constituent (a)	**Ing HQ**	**Inh HQ**	**Total HQ**	**Ing**	**Inh**
1,1,2,2-Tetrachloroethane	0.0000005		0.0000005		X
1,4-Dichlorobenzene	0.001		0.001		
2,4-Dichlorophenol					X
4-Chloroaniline					X
Antimony					X
Arsenic					X
Benzene					
Chlorobenzene					
Chloroform					
Ethylbenzene					
Heptachlor epoxide					X
Naphthalene					
Nitrobenzene					
Pentachlorophenol					X
Phenol					X
Total PCBs					X
Trichloroethene					X
Total HI:	**0.001**		**0.001**		

Notes:
All HQs are for groundwater, unless otherwise noted.
gw - Groundwater.
(a) - Only constituents for which HQs were calculated are included here. See Table 6-20.
COPC - Constituent of Potential Concern.
HI - Hazard Index.
HQ - Hazard Quotient
Ing - Ingestion.
MLE - Most Likely Exposure.

APPENDIX S

GROUNDWATER ORDINANCES

ORDINANCE NO. 99-5

AN ORDINANCE PROHIBITING THE USE OF GROUNDWATER AS A POTABLE WATER SUPPLY BY THE INSTALLATION OR USE OF POTABLE WATER SUPPLY WELLS OR BY ANY OTHER METHOD

WHEREAS, certain properties in the Village of Sauget, Illinois, have been used over a period of time for commercial/industrial purposes; and

WHEREAS, because of said use, concentrations of certain chemical constituents in the groundwater beneath the Village may exceed Class I groundwater quality standards for potable resource groundwater, as set forth in 35 Illinois Administrative Code Part 620, or Tier 1 residential remediation objectives, as set forth in 35 Ill. Adm. Code Part 742; and

WHEREAS, the Village of Sauget desires to limit potential threats to human health from groundwater contamination while facilitating the redevelopment and productive use of properties that are the source of said chemical constituents;

NOW, THEREFORE, BE IT ORDAINED BY THE VILLAGE COUNCIL IN THE VILLAGE OF SAUGET, ILLINOIS:

Section One: Use of groundwater as a potable water supply prohibited.

The use or attempted use of groundwater from within the corporate limits of the Village as a potable water supply by the installation or drilling of wells or by any other method is hereby prohibited.

Section Two: Penalties

Any person violating the provisions of this ordinance shall be subject to a fine of up to $100.00 for each violation.

Section Three: Definitions.

"Person" is any individual, partnership, co-partnership, firm, company, limited liability company, corporation, association, joint stock company, trust, estate, political subdivision, or any other legal entity, or their representatives, agents or assigns.

"Potable water" is any water used for human or domestic consumption, including, but not limited to, water used for drinking, bathing, swimming, washing dishes, or preparing foods.

Section Four: Repealer.

All ordinances or parts of ordinances in conflict with this ordinance are hereby repealed insofar as they are in conflict with this ordinance.

Section Five: Severablity.

If any provision of this ordinance or its application to any person or under any circumstances is adjudged invalid, such adjudication shall not affect the validity of the ordinance as a whole or of any portion not adjudged invalid.

Section Six: Effective Date.

This ordinance shall be in full force and effect from and after its passage, approval and publication, as required by law.

INTRODUCED AND READ FOR THE FIRST TIME: October 12, 1999

READ FOR THE SECOND TIME:
(under suspension of rules): October 12, 1999

READ FOR THE THIRD TIME:
(under suspension of rules): October 12, 1999

ADOPTED AND ENACTED: October 12, 1999

ROLL CALL VOTE:
Ayes: Adele, McDaniel, Rich, Cates, Thornton, Sargent
Nays: NONE
Absent: NONE
Unfilled Vacancy:

APPROVED: October 12, 1999

APPROVED:

President (mayor) Pro Temore

ATTEST:

Village Clerk

ORDINACE No. 981

AN ORDINANCE PROHIBITING THE USE OF GROUNDWATER AS A POTABLE WATER SUPPLY BY THE INSTALLATION OR USE OF POTABLE WATER SUPPLY WELLS OR BY ANY OTHER METHOD

WHEREAS, certain properties in the Village of Cahokia, Illinois, have been used over a period of time for commercial/industrial uses; and

WHEREAS, because of said use, concentrations of certain chemical constituents in the groundwater beneath the Village may exceed Class I groundwater quality standards for potable resource groundwater, as set forth in 35 Administrative Code Part 620, or Tier 1 residential remediation objectives, as set forth in 35 Ill. Admin. Code Part 742; and

WHEREAS, the Village of Cahokia desires to limit potential threats to human health from groundwater contamination while facilitating the redevelopment and productive use of properties that are the source of said chemical constituents;

NOW, THEREFORE, BE IT ORDAINED BY THE VILLAGE BOARD IN THE VILLAGE OF CAHOKIA, ILLINOIS:

Section One: Use of groundwater as a potable water supply prohibited.

The use or attempted use of groundwater from within the corporate limits of the Village as a potable water supply by the installation or drilling of wells or by any other method is hereby prohibited.

Section Two: Penalties.

Any person violating the provisions of this ordinance shall be subject to a fine of up to $1,000.00 for each violation.

Section Three: Definitions.

"Person" is any individual, partnership, co-partnership, firm, company, limited liability company, corporation, association, joint stock company, trust, estate, political subdivision, or any other legal entity, or their representatives, agents or assigns.

"Potable water" is any water used for human or domestic consumption, including, but not limited to, water used for drinking, bathing, swimming, washing dishes, garden or lawn watering, or preparing foods..

Section Four: Repealer.

All ordinances or parts of ordinances in conflict with this ordinance are hereby repealed insofar as they are in conflict with this ordinance.

Section Five: Severability.

If any provision of this ordinance or its application to any person or under any circumstances is adjudged invalid, such adjudication shall not affect the validity of the ordinance as a whole or of any portion not adjudged invalid.

Section six: Effective Date.

This ordinance shall be in full force and effect from and after its passage, approval and publication, as required by law.

ADOPTED: 6-06-2000
(Date)

Louise Brown
(Village Clerk)

ADOPTED: 6-06-2000
(Date)

Melvin King
(Mayor)

Officially published this 21st day of June, 2000.

STATE OF ILLINOIS)
)
COUNTY OF ST. CLAIR) SS
)
VILLAGE OF CAHOKIA)

CERTIFICATE OF VILLAGE CLERK

I, Jessie Brown, Clerk of the Village of Cahokia, St. Clair County, Illinois, do hereby certify that as such Village Clerk of the Village of Cahokia, Illinois, I am legal custodian and keeper of the journal of the proceedings of the Village of Cahokia Board of Trustees of said Village, and I do certify that the attached documents are true and faithful copies of said documents. I do further certify that the original of said documents are now remaining on file and of record in my said office.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the seal of the Village of Cahokia, Illinois, the 6 day of June, A.D. ~~19~~ 2000.

Jessie Brown

Jessie Brown, Village Clerk
Village of Cahokia, Illinois

(SEAL)